THE NEON NEWS

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SHUTTIN' DOWN, MOVIN' ON

NUMBER 17 December 1995

Who solves price riddle in a hungry neon world?

Artist blames mall neon toys

By Joe Augusta

Question: What do you call someone who sold his small neon sculptures 20 years ago for $175, who spent the last 20 years refining and perfecting his craft, and who is lucky now to get $95 for his latest work?

Answer: Yours truly.

Well, what happened? Let's stroll through our neon neighborhood together. There's Radio Shack; see the neon phones in clear plastic that flash the neon when they ring? They're $40. Neon clocks with dimmers are $35. Look across to the camera shop – neon wands like thermometers for King Kong: $25.

Do you have a Costco nearby? Check out the OPEN signs, complete with electronic transformer, mounted on a nice window frame, for $125 retail. It must be magic, because such transformers run about $45, glass plus electrodes plus frame, GTO, carton and shipping... Doesn't leave much for shop expenses like gas and electric, rent and maintenance of equipment, and that small but pesky expense, the glassbender's wages.

So, what planet do these signs come from? Wisconsin?

Could it be that we are witnessing the Decline and Fall of Neon? Has neon, which had such a visible resurgence here, spread itself too thin as it ventured beyond our borders to Central America, Europe, Asia and especially China? Is offshore production (and Third World wages) the future of neon?

Looking for the thread

Let's look back 100 years: Ionization of neon was first accomplished by Rutherford, an Englishman, but Georges Claude produced the first neon sign in France and saw neon's commercial potential. Neon came to America in the 1920s, and by the '40s it was THE outdoor advertising medium. The 1950s saw European artists like Lucio Fontana and Rario Merz experimenting with neon, though it took another decade for Americans like Chryssa, Segal and Antonakis to try their hand at it.

Meanwhile, neon began to fade in the advertising world, giving way to plastic as the medium of choice. Neon remained passe until the '70s, when quickie neon schools popped up and suddenly neon was IN once again. Every shop, bar and eatery had to have its neon, frequently artist- or architect-designed. (Some even bought neon art!) In the '80s, America discovered bromo blue pumped red! Turquoise plus pink! Diners came back, poster neon turned up. Like everything else during those years, we just couldn't get enough.

(see Prices west, page 15)

Bender blasts 'quality-free' foes

By Ed DeZuzio

...It is difficult to understand what has happened to the market. The seemingly low prices of custom and production luminous tubing hit cold and hard with just about every quote I give. In speaking with my landlord and sign associate I have reached some conclusions. The most recent being the type of people who are investing in Main Street America. The types of stores and their owners are straight from the MELTING POT THEORY of my grammar school history classes. A sort of Culture Explosion emanating cutthroat tactics for the small shops. What do you say or do when a prospect says that the price you gave them is 60% higher than your competition's? "A little competition never hurt anyone"? I think not.

The competition out there is only cutting its own throat. The harm cutthroat prices can do will affect the larger economy and welfare of the industry. I saw something similar in Holland. If the lead glass technique didn't receive the resistance it did and had been more successful, the entire economy of the Dutch sign industry would have been turned inside-out and upside-down. I returned to America as a student of what-goes-around-comes-around. The competition here in Joisey are from Russia, Cuba and China. God bless em!!! (In a way it's not at all how I feel.) They have come here to fulfill the American Dream. Yes, the American Dream. Something that Americans perhaps take for granted too often. However as an immigrant or naturalized citizen it is a vision carried in the heart from the first days of conscious childhood. Other competition here in Joisey is from the shops producing Quality-Free Neon.

That brings about a second conclusion which I have been kicking around for a few years. Are the shops that your prospects call your "competition" really YOUR competition? Do you also produce Quality-Free Neon? Do you install unenclosed transformers on rooftops without caring? Do you install outdoor-type, unprotected transformers inside on window ledges of Chinese restaurants? Shame on you if you do. If you don't then you know that the shops which do ARE NOT competition. They just happen to be in the same business. What is going to happen when the front page of your local paper shows the mayor's daughter getting CPR? Huh? The story might read something like this:

"Six-years-young Andrea was preparing to leave the table to ask the waiter for a pot of fresh tea when her dress was caught by the table leg. She tumbled to the floor, spilling the remaining tea. Her mother, Mayor Susan Main Street leaned over to catch her, placing her hand on a black box resting

(see Prices east, page 17)

Neon folk find lively exchange on the Net

If you don't have a computer and an internet provider, here's your new and very good reason to get one. The kind of computer – an IBM clone – you need to get started can be found new for under $1,000, much less if used. A modem can be had for $60; a "local internet provider" means a local phone call – once set up there should be NO additional charges, phone bills, etc., just a monthly unlimited-use access fee of $25-$30. In some rural areas there is still no local phone access number, but this is changing fast.

The "neon mailing list" subscription process is simple: send e-mail to "listserv@NETCOM.COM" with the following message: subscribe neon-l <your e-mail address>. There is no fee for this.

Anything you send to the list will then be forwarded to everyone on the list; anything anyone else writes will be sent to you as well.

The list is run by John Anderson of Mega Volt Neon, Austin TX; he can be e-mailed directly at dead@netcom.com.

Some neon-related Web sites for once you're up and running:

- Kenny Greenberg: http://www.neonshop.com
- Jacob Fishman: http://www.mcs.net/neofish/home.htm
- John Popadiuk: http://navishow.web.aol.com/lab/p/planetdesign
- Signweb: http://www.signweb.com

Topics discussed thus far on the "neon list" have included:

- bombarding
- manifold design & cleaning
- mercury-tube repumping
- sources for equipment, new and used
- oven annealing
- solid-state transformers
- computer-controlled sequencers
- UL issues
- installation components
- photographing neon
- blowers & air regulators
- advice to beginners, and setting up new shops
- borosilicate glass: working with and electrode sources
- job openings and workers seeking jobs
- pattern-making

Excerpts from various discussions:

A few weeks back we were meeting with our new insurance agent after the old dude retired; I'm not sure EXACTLY what I said, but it was something about coverage for burning the house down after I set up my shop... The agent suddenly became very serious and my wife just about passed out as I was babbling on. Let's hope I can be more careful operating all this stuff than I seem to be talking about it!

- J.D. Schueler

I think secondary protection circuitry is going to be the wave of the future. Once it is workable, it will go a long way to protecting jobs that some Bozo put in. The idea of reducing the secondary voltage of transformers to 10k max will only cause more problems. As it is now, you have guys overloading 15k transformers. If you give them a 10K, do you think that they won't overload them too? And there will be more connections to fail with more transformers, etc. Just another area I don't agree with. Funny how most of the solid state transformers aren't above 10K. I wonder...

- Tom Biebel

I like 704 as a manometer fluid since its viscosity is much lower, and is much more responsive and easier to de-gas.

- John Anderson

Wouldn't you need to recalibrate your scale to match the specific gravity of this? Or is it close enough to butyl pthylate to not matter?

- Ted Pirsig

(See Net, page 6)

Dear survivors,

We've decided to bow out from under Neon News, ending with this issue.

When we started this newsletter in the late '80s, sign magazines weren't covering neon much, and neon people hadn't gotten together in print or in person to swap stories, product reviews, tips and questions. Now several magazines cover neon better, though efforts to organize a benders' group have stalled out. We have enjoyed the network, but people aren't contributing enough material for regular issues.

Now too the Internet has enabled better information-sharing, with more opinions aired faster than we could ever dream of. Even non-computer-nerds should join the "neon-list;" it lets everyone have their say.

For those of you with remaining subscription credit (mailing label indicates your last issue paid) we'll be happy to send you back issues or, with 3 issues or more, a Neon News T-shirt.

But drop a line quick for these, as our next stop is a two-year move to Tokyo in January, where Val joins the Japan Times and Ted takes a neon sabbatical with Lionel. He may be homeschooled if public schools won't take him, but for a kindergartner he is pretty good at Japanese!

Usually in this space we thank our writers, but to say goodbye we send best wishes for a splendid 1996 to you readers, who made publishing this little rag more personally rewarding than we ever expected. We've gained friends and enabled romances, had fun and learned a bunch.

Please stay in touch via the Internet lists or e-mail us in Japan directly – neonnews@pobox.com – and we will post items on Japanese neon and whatever else we turn up there.

The fun never stops! Nor does the packing, Val grumbles...

Val + Ted

The Neon News was published periodically by Ted Pirsig and Val Crawford, P.O. Box 668, Volcano, Hawaii, 96785 USA. Back issues are still available at $4 each or $50 for the entire set.

Turn on the bubble machine!

By Ted Pirsig

Picture, if you will, your basic 10mm green neon tube stuffed into and passing through a clear-glass 15mm tube. At the bottom of the 15mm tube side-tubulate with 5mm glass; seal the bottom where the 10mm tube passes through with 100% silicone rubber. Mount vertically; connect the 5mm glass to an aquarium pump. Pour water into the top of the 15mm tube, then a few drops of ink. Turn on the air pump and light up the neon:

If the water is pitch black, you have green dots moving upwards. If the water is blue, you have a deep aqua tube with green dots moving upwards.

If your range of inks feels limited, go buy the concentrated liquid watercolors with the eyedropper in the lid for $5 at art supply stores.

With 10mm inside 15mm glass, you get very even dots -- kind of hypnotic. With larger outside glass, it becomes more "bubbly."

With multiple colors welded together, you get dots that change color as they rise.

And with two or three tubes in a 25mm outer tube, you get all kinds of stuff.

To control the air flow I found fancy little stainless steel gate valves at $7 each from the aquarium shop.

To control the air even better I used an electric dimmer on the pump.

To control evaporation I sealed the top of the outer tube, and routed an air outlet back down and to the now-modified air pump (your $5 aquarium pump has no "inlet").

If this is starting to sound Rube Goldberg-ish, believe me, it was.

To keep the modified pumps from leaking air on the "inlet" I tried many kinds of epoxy and plastic cement, but was never too happy with the results. Water would always form in the air line and go into the pump, making it noisy and unhappy. So I started to mount the pumps up high so they'd drain it out.

To control the occasional blast-o-matic surging, I built an overflow reservoir out of a small plastic box -- when the volume of water gets lower due to evaporation, the pressure against the air is reduced and so the air starts going faster, reducing the amount of water and so on until blastoff.

To make an overflow reservoir that wouldn't leak I switched to sheetmetal, soldered and with a screw-on cap.

To make it all look slightly presentable I built wooden cabinets -- and I'm no cabinetmaker.

To keep the bottom "air-in" tubulation from breaking off and dumping ink in the event of an accident (of which there were several) I instead routed a 5mm tube inside the whole length of the larger tube, next to and in back of the neon, with a slight hook on the bottom to put the bubbles in front. This meant that I could no longer fit 10mm inside 15mm and get that wonderful hypnotic effect, but such is the price of progress.

To prevent mold and other aquatic life I added bleach.

To keep the ink from being bleached out I tried other dyes and inks.

Then I tried other mold-killing agents like ammonia.

To keep the room from smelling vaguely like bleach or ammonia I tried, oh hell, I can't even remember what (this was seven years ago).

If this is starting to sound Rube Goldberg-ish, believe me, it was.

The system would never function fully closed; that is, the water would always need topping up, the killer drops always need adding, sooner or later.

Nevertheless, "GOTCHA" (a surfwear company) liked the look enough to want to make a bunch of bubbler displays. The man in charge of advertising was a pain in the butt, but fortunately I was just a neon-room peon at a largish sign company and didn't have to deal with dollars and contracts -- I could just work on ironing-out these "technical details."

A 4'x 4' metal can was fabbed up with a beautiful glossy black paint job and their back-lit logo in the middle and two of these bubbler tubes stuck on either side in channels built into the metal. I made a central overflow tank, and we bought a $100 baby air compressor that had an industrial service life and heck, a built-in vacuum inlet too.

I got to twiddle with my prototypes for weeks in the corner of the neon shop (sure beat cranking out channel letters) which prompted comments like "you get all the fun" from other employees.

Here my memory mercifully draws a blank, but I just remember that there were endless rounds of try this, try that, try that, but after two weeks it fails and try something else, but we did get it lit and running.

Then they mounted it square-on center when you walked in the door at their outlet at the state's biggest shopping center, up at the top of their mezzanine, above a rack of clothes.

Couple weeks later I get a call to go service it -- seems that all the water and dye leaked out, all over the clothes.

A month later I serviced it again -- seemed that the "central air supply" theory wasn't so good -- it would find a "weak" tube with less water pressure in it and send more air there, and so on until total unbalance, sending all the air up that tube and none up the others. I ripped out the fancy air compressor and put in four $5 air pumps (modified) and four dimmers.

Quit my job, started our business over here, one day I get a phone message from the obnoxious Gotcha rep... I never even CONSIDERED calling him back!

I heard that later my old employer ripped out the waterworks, threw in some plain neon, to finally be done with it.

I still keep about a dozen of the prototypes in storage, to work on someday -- the look of it is so hypnotic that there's gotta be a way around the bugs. When our kid was a year old we had a bubbler propped-up and running in the living room and he'd sit in his carseat and stare at it for over an hour at a stretch...

Again, if you want to try it: the central problem seems to be keeping visible flora out of the wet tube, but there must be a mildly-toxic liquid that allows the dyes to last awhile. The overflowing surges could be controlled by having a sensor that just shuts the air off until the tank gets topped up again, or by rigging a more-closed system.

Silicone rubber on glass ain't it -- from the same time period I have a nightlight that stays on 24 hours, and the front wall of it is plain lead-glass straight tubes filled with colored water, carefully sealed at each end: they go down about a half-inch per year. I've topped them up by injecting more water with a hypo needle, but that makes a better evaporation path...

SOMEDAY, right, SOMEDAY...(sigh)... ♦

More glass tricks for holiday ornaments

"It's a great exercise in control -- of glass, temper, language and hands."

By Candice King

There are good reasons to make Christmas ornaments: First, the basic ornament provides the building blocks of skills for more complicated pieces. Ornaments are quick, and you are more likely to succeed before the frustration makes you go bonkers. And finally, you have a use now for your glass scraps... if you get into it, you could hit a few holiday craft fairs and sell them, or publicize your shop with a pretty gift for regular clients...

A word of encouragement: If you had the patience to learn neon, you have the patience for ornamental glass. But like learning neon, it takes a lot of practice, and it relies on an overflowing scrap can filled with dead soldiers. Gradually the work becomes smoother, stronger and easier, and you already have the advantage of knowing what hot glass feels like, and have mastered the fear of cut fingers. Take heart.

The instructions I will give are for 15 mm glass, but it applies to tubing up to 25mm. I normally work with 18mm and 25mm glass. Call your sign supplier and see if they will order the larger glass for you. Most shops are overrun with 15mm scrap glass and it's free, so we'll start with that. I suggest you begin with clear glass, and save your classic scraps until later.

To get started, get out your trusty bottle of Windex and clean the glass inside and out. Dirty glass does not make pretty ornaments. To clean the inside of the tube, squirt Windex into the tube and roll it around to coat the inside. Next, attach a tie wire or string to a swab and pull it through the tube, then pull a dry swab through to absorb moisture and remove residue. NEVER EVER push a swab through tubing. I have seen the tubing break and deliver a nasty cut. I have a friend who ended up in the hospital on an antibiotic IV drip for a week because such a break cut into one of her bone joints.

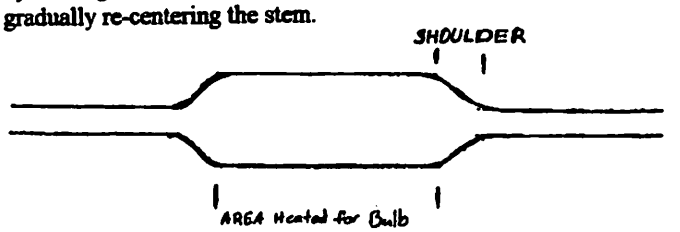
The first step in ornamental blown work is "pulling stems" or "points." Basically you are making handles to turn the glass quickly and not toast your fingers while controlling soupy hot glass. Unlike neon, with ornamental glass you work with one hand under and one hand over the tube. If you are right-handed, the left hand is over the tube, and is the drive hand. The right hand is under the tube, and is the keep-up hand. Reverse this if you are a lefty. All instructions are for right-handers so keep this in mind. You will need to decide for yourself if you have more control turning the glass away or towards your body; I learned to turn it towards me but there is no right or wrong, just what feels best to you. It will feel awkward in the beginning.

Now let's get some glass into the fire. To pull stems from 15mm glass, heat a section about 2.5 to 3 inches in the center of a tube at least a foot long. (I will get to shorter pieces later.) The tendency with neon folks is to work the glass from side to side as you roll the tube back and forth; forget that and focus on going around and around. There is a rhythm to the side-to-side motion. I count to four on the left edge, to two as I cross the center again, and repeat. Keep in mind that you cross the center twice as often as each edge. This rhythm helps to keep the heat even, allowing an even distribution of the glass when you pull it. While heating the area keep a slight inward pressure on the tube, gathering it slightly. You should see the wall thicken. Get the glass MUCH hotter than you would for a bend, the glass turns a golden honey color. Now making sure it is turning true before you start to pull. Keep turning the glass and stretch the heated area approximately 18". Heat the center of the stretched area and pull slightly, you should now have two pieces of glass. Make sure the sealed ends are straight, so they don't catch on your hands later. It will take practice to learn how fast to pull the stem: too fast and it will be thin and weak, too slow and it will be short and become too hot to hang on to when you begin the ornament. NOTE, If using 18 or 25mm heat a four-inch section of tubing and preheat the area over the torch first. Placing large diameter directly in the fire can cause it to shatter from stress. Place the freshly pulled hot stems in a rack to cool where they don't touch each other. Don't lay them flat on the table either or the stress monster will get them.

If total frustration overcomes you, you can do this over the ribbon burner. Do not forget to gather the glass. It is difficult with large-diameter glass to keep even heat with a single sided torch, so try it in the crossfire, it's a great exercise in control -- of glass, temper, language and hands.

Now that your first stem has cooled you are ready to pull the stem on the other side. Hold the cooled stem in your left hand with the overhand position. Skip over approximately two inches of tube, which will become the bulb, and begin heating another section of tubing which will become the second stem, using the same timing and motions described above. If you are working with short pieces it may be necessary to seal two sections of glass together. With the seal in the center of the area to be heated, continue as before. If there is more than two inches of glass between the stems, you can always heat a section in the middle and pull the proper size needed. Make sure to use a file and snap off one end of the stem so it is open to the atmosphere.

Now that the two stems are pulled, hold the tube in both hands and spin it to see if it turns true. If not, go back into the torch and straighten it. Adjust the side that is most wobbly first. This is done by heating the shoulder of the stem, while turning the piece and gradually re-centering the stem.



Repeat on the other side if needed. You may need to switch back and forth a few times if it is way off-center. Take your time, because starting out with an unevenly spinning tube makes it difficult to end up with a round ornament.

Heating the glass for the bulb of the ornament is much the same as the technique for heating stems. Use the same rhythm. With the open end of the stem in your right hand begin heating the glass. Hold the glass under the crossfires so that only the top of the tube is in the flame. Slowly gather the glass, as it starts to get out of control remove it from the fire and give a small puff into the stem. Remember to always keep the tube turning. At this point do not try to enlarge the tube, only keep it turning true and get the heat even.

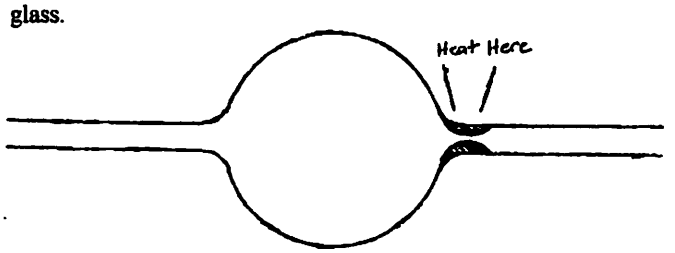
This process will be repeated two to three times before finally blowing the ball. Lead glass stays hot a long time so do not rush, blow slowly at first. It helps to turn the piece several times once you're in the blowing position (which is 45 degrees from the chest), before you blow. This allows the temperature to even out a little and gives you

(see Ornaments, next page)

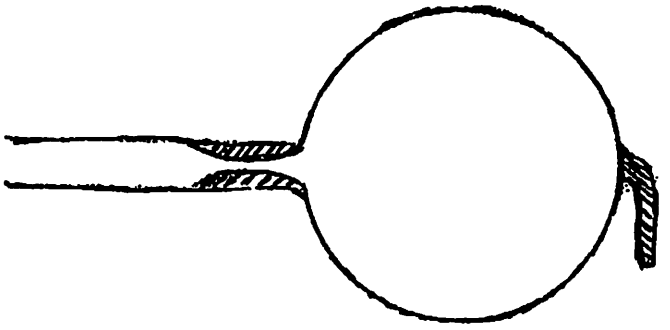
(Ornaments, from previous page)

a chance to re-center the stems if slightly out of true. By pulling a little as you blow an elliptical shape is achieved instead of a sphere. If the ball looks pregnant or wobbly the problem is uneven heat or it was out of true when blown. If the stems begin to melt when you heated from shoulder to shoulder, they were pulled too thin. Do not try to blow the biggest bubble in the world. With 15mm tubing it should be about two inches across, with 18mm to 25mm three to four inches is good. When it is not too thin you should be able to bang it on the table (within reason) and not break it.

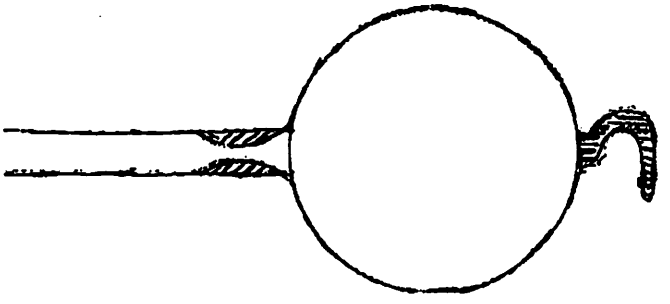
Begin the finish work while the glass is still hot. Start with what will be the bottom of the ornament first, working on the underside of the flame begin heating the stem next to the bulb, while slowly rolling it back and forth in your fingers. Allow the glass to thicken and the hole to shrink to about 1-2 mm. Remove it from the fire and slowly pull about a half-inch while continually turning the glass.



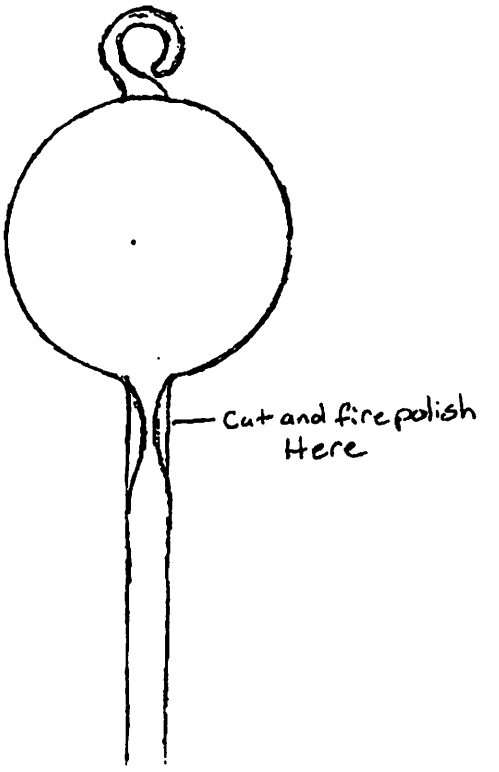
Don't let the hole close up. Use a file and snap the tip from the other stem so both ends are open. Go to the other side of the bulb and once again heat the stem next to the bulb. This time allow the hole to completely collapse, and continue to gather glass from the stem until the solid glass area is about 6-7mm thick. Remove from the heat, give a quick puff into the bottom of the ornament. Then slowly pull about 1.5 inches. Heat and pull off glass until there is about an inch of solid glass remaining. Heat next to the bulb and allow the one-inch section to fall until it is 90 degrees from the piece.



Turn the piece so the tip is now pointing up. Heat a half-inch next to the body and let it arc over, forming a half-circle.



Heat the next half-inch and allow it to fall, forming a loop for hanging.



If the loop is out of shape use a carbon rod or file handle to help form the circle. Look at the hook from several angles to make sure it is straight; if not, heat it a little and use the carbon rod. Heat the whole ornament over the crossfire for one minute until it is all one temperature. Place the ornament in a rack to cool. Once cool, use a file to cut the center of the thickened area on the bottom of the bulb. Sneak under the fire and flame-polish the sharp edges. TA DA! An ornament is born!

If you want to get fancy, try adding some color. Take some clean classic glass and crush it. This can be done in a coffee can: cut a hole in the lid to allow a handle to pass through. Use a hammer or homemade smashing device to pulverize the glass. Use the lip as a shield to protect your eyes. Place the glass on a clean metal surface. When first heating the glass for the bulb, roll the hot glass in the crushed glass. Melt it in well before blowing the bulb. Bullseye brand fusable compatible stained glass is tested to have a 90 coefficient of expansion (the same as sign tubing) and will work fine. I think they even sell frit (crushed glass). They also have stringers, which are thin rods about 2mm thick. These can be melted randomly onto the bulb glass before it is blown. Just make sure the bulb glass is kept evenly hot while applying the stringers, or it will crack. If the stringers don't want to stick, the bulb glass isn't hot enough.

Have fun. If there is enough interest I may make a video; my address is 1425 Eldorada Rd., Winston-Salem NC 27103.

*<**Editors' note:** For further information on exotic glasswork, Kent Fiske of Jackson WY sent this list:*

-- Glass Line (periodical "for art-oriented lampworkers"): P.O. Box 847, Huntington Beach CA 92648

-- Independent Glassblower (published for "off-hand", or furnace, glassblowers): HC 30 Box 25, Barnet VT 05821

-- Glass Art Society (promotes all glass art, even neon): 1304 4th Ave Suite 711, Seattle WA 98101.> ♦

Underloaded neon not helped by repumping

By Don Hood

It was one of those sad days in the neon shop that didn't get any better when a familiar duo of neon installers appeared. They had that same little piece of neon: third time that year. "Here it is again, and no, we don't understand it either. When can we have it repaired?"

"Come back tomorrow," I said. New electrodes on the tube, pump it. Strange, I thought, it's always that same tube with the odd length, from the end of a long contour line.

Later in the day the boss from that company came by and informed me that the entire installation would be taken down and repumped. "That will finally solve this ongoing problem," he told me.

I protested that the installation was hardly three years old and didn't need repumping, but he flatly refused. He said he knew better – I think he studied some vague subject years ago, received a title for it, what did I know?

The next day all the tubes and all the transformers were brought to our shop. The tubes looked as good as the day they were made, and lit up perfect on the test bench. "Money is money," I thought, "here we go."

When the tubes were finished nobody could see the difference in light output or brightness, so I decided to age and calibrate the tubes with the transformers that had been brought in with them.

I connected the tubes with a milliamp meter, plugged in the transformer and BOOOOMMm. The needle from the meter went off the scale, into the corner of the meter. I quickly pulled the plug, repaired the mA meter needle by straightening it, then doubled the length of tubing. There – a perfectly loaded transformer. Amazing! The entire installation needed only half the number of transformers.

I made a new wiring diagram for the installers and they put the installation back with half the amount of transformers. Honestly speaking, I didn't have the courage to mention this to the company boss at the time, but after a couple of years without problems I felt the time had come – WRONG!

I thought the company boss was having a heart attack: he looked like his heart had turned from four-stroke to two-stroke. Who did I think I was? Where did I get the idea to change the original wiring diagram? Did I think that I knew better?

I decided to pacify him before he simply exploded, and told him to send his installers by that afternoon – they could pick up everything and return the installation to its original state. He stormed out of the glass shop, and within an hour the familiar duo were at the door.

The following week I was having one of those sad days in the neon shop, which didn't get better when the duo appeared. The older of the two shrugged his shoulders and handed me that same old piece of neon, "Here it is again and we don't understand it."

"Come back tomorrow," I said. New electrodes and re-pump. "Strange," I thought.

(Net, from page 2)

Absolutely. In fact, it will have a different calibration than 705. I'm not sure of butyl's exact specific gravity - but 704 is 1.07 and the 705 is 1.09. I've calibrated scales for both silicones, and they are very close but enough to make up separate scales.

Besides lower vapor pressure, silicone oil is easier on any o-rings it happens to contact. An o-ring supplier in Dallas looked at Butyl Pthylate in a compatibility chart for me awhile back. It's surprising how many elastomers it's "not compatible" with. The list (included) Viton, common in greaseless stopcocks. FETFE is somewhat better. If a manometer made with such cocks can slam fluid up to the seal, it will ruin it in short order. This was what brought me into the o-ring supplier in the first place - a recurring leak at the u-gauge stopcock.

The silicones don't have that degrading action (in fact are recommended for conditioning Viton o-rings). Butyl is still lower in viscosity, and a bit easier to see because of its color.

I bit the bullet and bought an Edward's 0-50 mbar gauge for filling. Mostly so I could entrust others to pump without slamming fluid all over the place. In many ways I miss the simple, accurate, and self-calibrating u-gauge! May go back to it some day.

-John Anderson

Strange to say, I've had success sending neon by US Mail Overnight Express. One time I was sending out to I think the Chicago 'Miss Saigon'. It was of course marked 'Neon Glass - Fragile' on every side. The postal clerk said "Hmm, neon, I bet that stuff is real fragile, huh?" I nodded in agreement. He then banged his rubber stamp all over the package and tossed it about 8 feet into the waiting cart of packages. My mouth dropped. He just shrugged and said "That's what's gonna happen to it anyway." Miraculously it arrived in one piece. Footnote: The stage crew broke it trying to install it.

-Kenny Greenberg

I've been monitoring this group since its conception, and I think I might be a little older than most of you. It brings back memories of when I first started working with glass back in the late '50s.

I was hired in a production shop and trained on the job by a gentleman who had been working neon for many years. This was a 20-man shop that did mostly beer signs. In those days we worked a lot of our bends in the ribbon burner, doing as many as six bends at one time. The slide in the ribbon burner would be specially made for the letter we were working on. It would have cut-outs that would allow just the right size flames in the correct locations to make several bends at one time using a jig made of metal or graphite.

For instance, take the letter "E": The glass would be heated in five areas to make all the bends at once. A plunger was used to support the raised area for the double-back.

This is not what I learned at first. I had to go through all the suffering and pains that you guys have endured to learn to make one bend at a time. We were making about 200 letters per day back then. It got boring after a while but it was some of the best training I ever had.

-Jim Futrell

There is an artist's studio shop in Spruce Pine, near Burnsville, 40 miles north of Ashville. This is the shop of David Wilson. This may be one of coolest studios ever. David works in an abandoned drive-in movie theater. You travel up a gravel road through a dense wooded area. Upon entering a clearing you see a giant white monolith between trees with vines growing down the face. This is the movie screen and the neon shop. In the center of the hollow stands the projection booth. It is the hot shop. You can see Dave at work at http://www.mcs.net/neofish/davetube.htm

-Jacob Fishman

As for any other glass shipped via UPS, I usually figure that up

(see More Net, page 11)

Neon videos offer different approaches

By Ed Biggar

I came to glasswork through a community college scientific glassblowing class, but I came to neon through video.

When in the late '80s I was bitten by the neon bug, I bought a crossfire and ribbon burner and started splicing. Full-time study was impossible, so I bought the Daco instructional video by Bill Davis.

I was so naive that for the longest time I bought a new glass file weekly because they didn't work very well after awhile – then the tape showed me how to sharpen them. I now have a great file collection (0 to 5, and extras too). I currently make my own colored glass tube and hollow sculptural forms and am devoting my life to illuminating objects and viewers alike.

Daco's instructional video

This three-tape series gives more than ten hours of practical, down-to-earth instruction. Bill Davis has a brisk manner and "tells it like it is" from long experience; When I first got my tape I'd watch it for a while and then yield to an overwhelming compulsion to play Tom Waits tapes while practising bends.

The tapes also show how to build shop fixtures and equipment, like tables, a lead-glass manifold and a nifty oilcan blockout painter.

Although this is not a high-tech approach to neon, it is very practical and covers a broad range of traditional techniques. These include pattern-making, all fires and equipment, the basic bends (90s, doublebacks, drops and welds). Side tubulations and mercury traps are shown in ample detail.

My tape is from 1989 and is well worth watching (I have watched it over and over). Its rough production values include blocked shots of demos, loud background noise (muffle that ribbon burner), and lots of fades and breaks – he even shows how to verbally diffuse a burn in progress <this means, gentle readers, that he swears on-camera!>. Bill assures me he has re-edited the current edition.

The demos include a block-letter "OPEN", a script "Cafe", and double outline of a D and an A. He uses all of the fires except the cannon, which he does show. There is a sprinkling of promotion for Daco, but this is periodic and subdued.

I'd rate this video the most informative for loners – someone isolated from neon schools but with access to equipment. To do all the operations shown you'd have to practice a lot of welds and bends, as Bill says in the manifold-building section. The bombarding section is good and shows how to flush a repumped mercury unit with natural gas (not for me!) and safety awareness includes mention of asbestos and high-voltage risks. (The mercury-filling sequence was scary to me.) I built 80% of my neon plant with this tape and found it invaluable.

To order, write Bill Davis, 2130 Brookside Drive, Mt Dora, FL 32757, or call (904) 735-0353; price $300 postpaid (also available from Daco Neon Equipment). Bill also offers individual instruction and answers questions.

An Introduction to Neon, by Jacob Fishman

This 90-minute video is well done and includes a brief history and all the basic bends, using a 5-point crossfire, a ribbon burner, and hand torch. It also shows how to make a basic sign from start to finish. The skeleton frame technique was really cool. Jacob covers quite a bit of safety information, including a first-aid kit by the manifold, a fire extinguisher, and mercury handling. Safety awareness is maintained by comments throughout the video. Jacob's demonstration is a multi-colored sign that spells "neon" There are good glass-forming tips and a section on tube processing using a fairly simple manifold and bombarder. I would recommend this tape for anyone interested in learning neon and it also could be used as a primer for a hands-on neon class. It is very well edited, has little background noise (except for the ribbon burner sequence), and uses an overhead camera to clearly illustrate bending on the pattern table.

To order ($74.95 + $3.00 shipping), write: Lightwriters Neon, P.O. Box 9022, Winnetka, IL 60093, call (800) 747-9115, or on the Internet: neofish@mcs.net, or http://www.mcs.net/neofish/home.htm. Jacob also conducts periodic classes in the Chicago area.

Neon Tube Bending and Processing, by the British School of Neon

This hour-long tape shows a different method of making neon, one used in the U.K. The video is very focused on heating and bending techniques, with detailed critiques illustrating bending errors.

The equipment used is very different from U.S. equipment: small bench burners and torches. There are no letter-forming demos and absolutely no safety emphasis. They blow directly into phosphor-coated tubes by direct mouth contact.

On the other hand, the tape is well edited, clearly presented and organized, with no background noise to distract viewers. There are some good procedures for working the sometimes difficult colored (soda lime) glasses. The bombarding section uses a high-tech Masonlite system and illustrates a technique using a helium rinse to evacuate impurities from the units. They use metric measurements and Americans will have to mentally translate measures and some terms. Basic bends include right-angle, return, drop and some butt welds for electroding.

This is a good tape for hard-core tubeheads but I wouldn't recommend it as a first choice tape for beginners.

Order through ST Publications, 407 Gilbert Ave., Cincinnati OH 45202; (800) 925-1110, ext 373 or 356.

Victory Neon instruction tapes by Vic Spankowski

This set covers bending in tape 1 and pumping and bombarding in a second tape. The hourlong tapes are $49.95 each, and they are both the cheapest and most controversial of the lot.

Every once in a while I have to step back and remind myself that there are few absolutes, what works for me won't work for you and so on and vice versa. However, these videos are full of information that conflicts with traditional neon techniques. Vic states, for example, that nowadays benders don't use the cannon or crossfire except for splicing, because the ribbon burner produces superior bends. This doesn't work for me, but I do know one bender who learned on a ribbon and uses it for most of his work (90s, doublebacks, drops, etc.). I had a bender who teaches look at the video, and he said according to his 50 years of experience a person should learn to bend the basics on the cross or cannon fires first, as it is impossible to do everything on the ribbon fire (I agree).

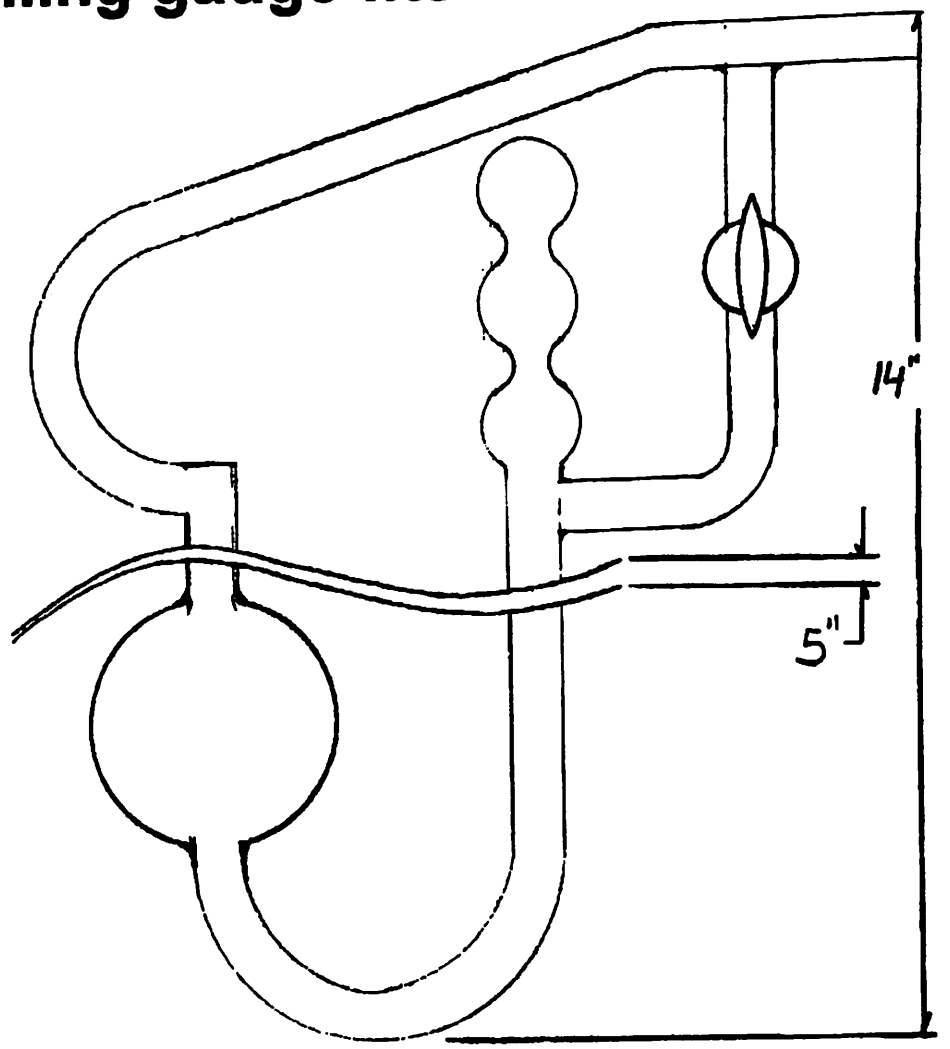
I found a few good tips in this video, like heating and holding electrodes vertically for even shrinkage, and looping the handtorch hose around your hand to keep it from kinking and going out.

Vic is selling equipment and giving these two videos in the package. The second video on bombarding doesn't work for me at all. As a serious student of vacuum theory, I found much of the information presented to be questionable and unfounded by facts, such as his assertion that with today's high-efficiency vacuum pumps, buying a diffusion pump is a waste of money because a good vacuum pump will get you down just as low as a vacuum pump / diffusion pump combination. How about speed? I understand that faster is better for good evacuation of impurities; not just degree of vacuum.

(see Videos, page 17)

Two from Ed DeZuzio

Filling gauge fits in 14 inches



Here is a shop-made filling gauge which was inspired by limited space for a new manifold system. Unlike filling gauges I have seen or built in the past this one is only 14" tall and is time-tested as reliable. The 2" reservoir holds plenty of fluid for filling 9mm tubes.

The blown bubble replaces the length of glass normally used for holding the fluid. The triple-stage expansion chamber on the stopcock side is designed to percolate the fluid should an undesirable atmospheric condition be introduced to the manifold. In other words, flaming butyl should not be a problem.

I used 10mm for the filling gauge and 20mm for the rest of the manifold. All the bends are heated on the ribbon burner – I found that the lazy curves from the ribbon burner will take more pushing and pulling than bends from a crossfire.

Quicker color sample kit has snap-in tubes

This is the ULTIMATE COLOR KIT. I have been searching for eons to design a simple and fast-to-build color sample kit, the most important part being the glass tubes. The method shown here for making the wire connections fills the order perfectly and even gives you the liberty of interchanging samples.

As you can see the tubes are straight; for each tube in the kit you will need two each of the following: 1/4" fuse clips; rivets; solderless eyelets (crimp-on wire terminals); 1/4" x 3" (or close enough) thinwall aluminum tubing – model airplane fuel line works very well. Your choice of end cap with a tight fit for the electrode and the aluminum tubing; Sintra or similar material for a mounting board.

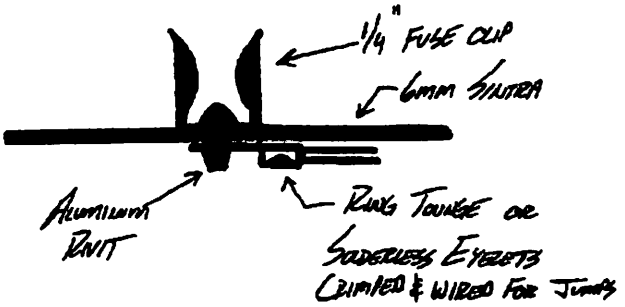
Steps:

1) Crimp the electrode wires within the aluminum tubing.

2) Secure the aluminum to the electrode with electrical tape.

3) Slide the end caps over the assembly at both ends.

4) Lay out the fuse clips on the mounting board; drill 1/8" holes in their place.



5) Assemble wire jumps long enough to reach between the tubes. Crimp an eyelet to each end of the insulated wire jump.

6) Rivet the fuse clip to the front of the mounting board at the same time the eyelet is riveted to the back. Wire the home runs and you're done.

A two-into-one homemade neon dimmer

By Telford Dorr

Sometimes you have to go backwards before you can go forwards. Trying to figure out the secret of dimming neon was like that. Here's the full story:

I had always heard that regular everyday incandescent-type light dimmers won't work with neon; however, being somewhat of a nonbeliever in conventional wisdom, I decided to try it to find out for sure. To make a long story short, the conventional wisdom is right. Regular dimmers don't work. Trust me.

It all started one day when the local hardware store had a sale on light dimmers, I think they were going for about three to four bucks. These were the cheapie type with the round plastic knob which doubles as a push on/off switch.

To find out whether they would work as neon dimmers, I dragged the trusty 15kv/30 burn-in transformer up onto the bench, grabbed some miscellaneous tubes and jumper wires, and hooked the whole mess up.

After turning the dimmer up to full brightness, I plugged the creature in.

Initial success! The tubes lit to full brilliance. Things were looking really good, except that I then decided to turn the knob on the dimmer.

As I rotated the knob, the tubes started to dim slightly, and then suddenly the room was filled with weird flickering stroboscopic light effects, followed by darkness. All in a matter of seconds!

After that, no amount of wire-wiggling or knob-turning would restore the light. We're talking serious dead here. Giving up, I bypassed the dimmer, which erased the darkness. Glowing tubes indicated the failure wasn't the transformer, which only left the dimmer. Connecting the dimmer to a 100-watt light bulb yielded more darkness. Whatever died inside the dimmer was apparently going to stay dead.

With nothing left to lose, I pried the cover off the dimmer to assess the damage. Reverse-engineering the circuit yielded Fig. 1.

The circuit (before flameout) worked like this: device Q1 is a triac, which is a power-switching device. When triggered, it switches to a fully conducting state, and stays that way until the current passing through it goes to zero. As it is connected to the alternating current, which changes direction 120 times a second, it will be turned off as often. The trick to making it "dim" lies in how and when you turn it on. That task is left to components R1, C1, and D1.

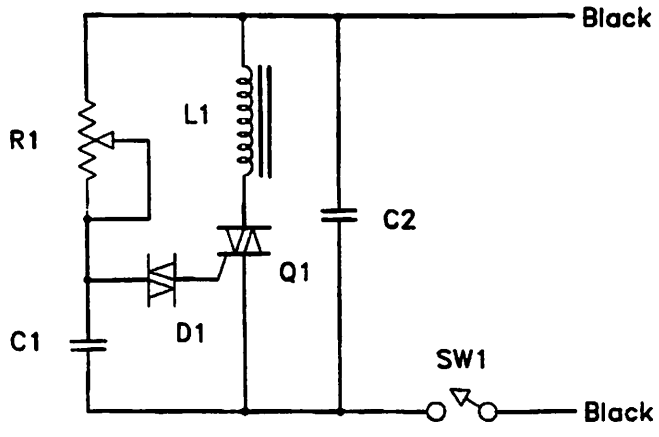


Fig 1 Original dimmer (before modification)

Assume the following: the alternating voltage applied to the upper black wire in fig. 1 has just (timewise) crossed through zero and is increasing. Current starts to flow through pot R1. (the thing on the other end of the plastic knob) and starts charging up capacitor C1. As you turn the knob clockwise, you decrease the resistance of R1, causing C1 to charge faster. Turning counterclockwise increases the resistance, charging C1 slower. In other words, the setting of the knob controls how fast C1 charges.

C1 will charge up until it reaches the breakdown voltage of diode D1 (known as a diac). In my unit, this occurs around 20 volts. Once diode D1 reaches its breakdown point, it switches into a conducting mode, discharging C1 into triac Q1, turning it on (once on, power is no longer available to R1, keeping it from recharging C1 for the duration). This whole process repeats 120 times a second. Because the time delay caused by the charging of C1, the portion of the AC cycle over which Q1 conducts regulates the time period during which power is applied to the light bulb load, and thus its brightness.

So what, you ask. Why did the dimmer die, and what's this got to do with neon? The problem is this: with a light bulb as a load, once the triac is triggered on, voltage is applied to the bulb, which immediately conducts current. This current keeps the triac turned on until the current cycles to zero, some milliseconds later. The neon transformer, however, is a partially inductive load, not purely resistive, like the light bulb. Applying voltage to an inductive load does not cause current to immediately flow; it takes a little time. The problem is, it takes too much time for C1, which uses up all its charge before the neon transformer gets going, and triac Q1 turns off again. This allows C1 to start charging again, during the same line voltage half-cycle! This process repeats, at breakneck speed, until the diac D1 overheats and dies.

Herein lies the secret: What we need to do is somehow keep trigger current flowing into Q1 long enough for the neon transformer to get going, without overheating diode D1. I did this, as shown in Fig. 2.

Fortunately, when I was buying dimmers, I somehow had the sense to buy two of them. With my first dimmer lying in smoldering ruin on the bench, there was not much left to do but scrap it out for parts, the most useful being the still good triac, Q1.

Opening up the second dimmer, I mounted the salvaged triac, now known as Q2, onto its frame. (Note: at three bucks for a dimmer, it's probably the easiest way to get the triac.)

I rewired the dimmer as shown. Added resistor R2 is a 3500 ohm, 5 watt power resistor. I mounted it to the dimmer frame (as a heat sink) with a small bracket and some silicone grease. Wire the modified circuit EXACTLY as shown in Fig. 2. Reassemble the

(see Dimmers, next page)

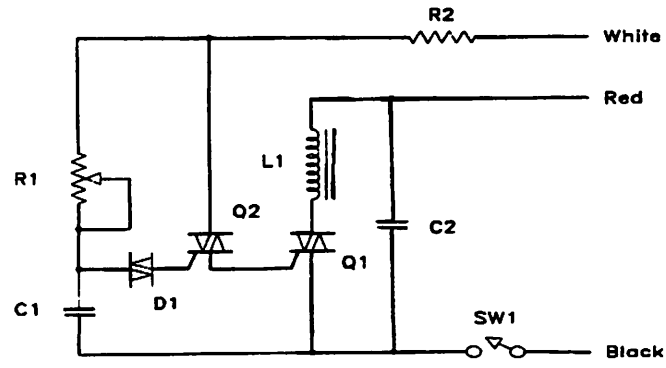
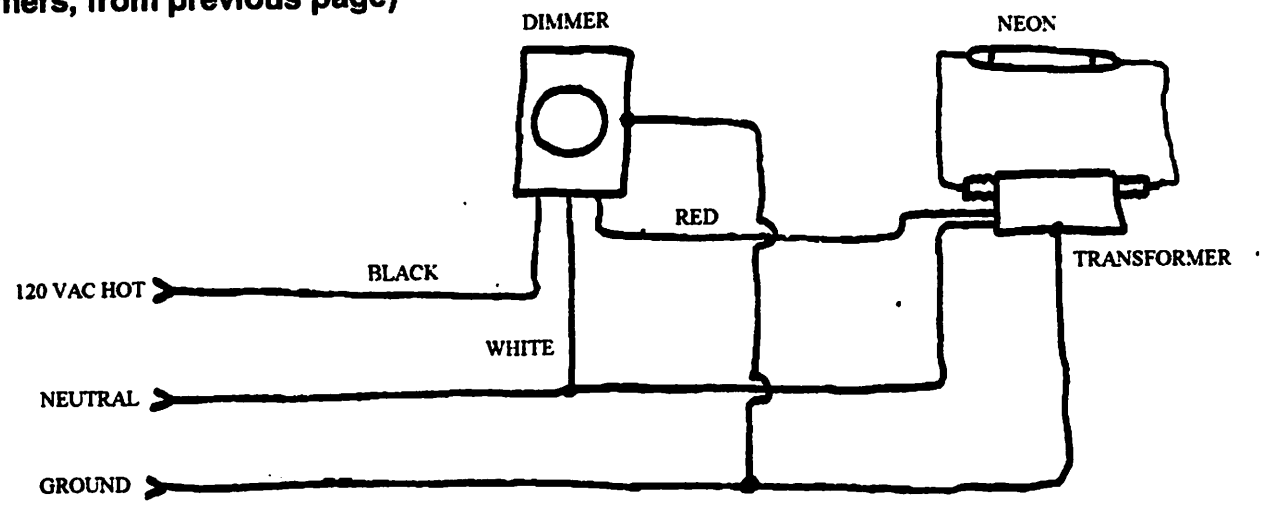


Fig 2 After modification

(Dimmers, from previous page)



dimmer cover, using small screws in place of the original rivets or pins.

Note the colors of the new wires: they are critical, as there are now three of them. When connecting up the finished unit, make sure the white wire goes to neutral, as does one end of the neon transformer. The other end of the transformer goes to the red wire. The black wire goes to the hot AC supply. The switch MUST break the black wire!

The new circuit works like the original, with the following exceptions: (1) When D1 triggers, it turns on triac Q2. Because it has a resistive load (R2), it turns on immediately. Current though Q2, limited to a reasonable level by R2, continuously triggers triac Q1, giving the transformer enough time to start drawing power. Later, as the line voltage goes to zero, Q2 turns off, removing drive from Q1, which, because of the transformer's inductive current time lag, turns off sometime after zero crossing.

Miscellaneous notes: the triacs used in dimmers seem to be internally insulated from their mounting tabs, allowing them to be directly attached to the (grounded) dimmer frame. Units purchased from Radio Shack and elsewhere may not be insulated, and thus require insulating mounting hardware. In some (really cheap) dimmers, diode D1 is located inside the triac, in case you can't find the diode in your unit. In the modified circuit, this is OK for Q2 but not for Q1. If you use one of these combo units for Q2, eliminate diode D1. In my dimmer, R1 was 250 ohms, C1 was 0.1 uf, C2 (keeps line noise from false-triggering triac Q1) was 0.047 uf, L1 (value unknown, came with dimmer) helps keep switching noise from leaving the dimmer.

Application notes: (1) DO NOT use this circuit with high power factor type transformers or solid state type transformers. It won't work. (2) It sometimes helps to use a higher than normal transformer secondary voltage, if you're going to operate neon down to very low brightness levels. Experiment to see what you need. (3) Working with 120 VAC is dangerous. Use all possible caution. To limit flame and damage during bench testing, temporarily connect a high-wattage light bulb in series with your AC supply wire. This limits the maximum current flow in case of a short. (4) Final note: never work on the high-voltage wiring to your tubes on a dimmer-controlled setup, unless you KNOW the power is off. With a dimmer turned all the way down, your neon may not light up, but you will if you grab the wiring.

Well, there's the secret: buy two cheap dimmers, and make one neon dimmer. It's easy when you know how (and why). ♦

Silent SOUND trick synchs animator speed

I have recalled a trick for making the time delay subroutine in the animation programs insensitive to the speed of the machine it is running on. This trick involves using a somewhat obscure feature of the SOUND instruction. When a program executes a SOUND instruction, the computer starts a tone going, and then continues with the next instruction. The tone, however, will continue for the duration programmed (1 second per 18.2 counts).

If a second SOUND instruction is subsequently encountered, the computer will stop and wait for the first SOUND command to finish before starting the second. We can, therefore, cause a consistent time delay by executing two SOUND commands, where the first contains the dely time desired and the second contains the minimum possible time. By setting the frequency of the tone very high (>32 kc), we won't be bothered by any actual sound from the computer.

To use this technique, replace the time delay routine in the code examples with the following line:

840 SOUND 32767,DELAY:SOUND 32767,1:RETURN

The actual delay time will be (DELAY + 1) / 18.2, in seconds. The minimum delay, when DELAY = 1, would be 2 / 18.2 = 0.11 seconds.

For the shortest possible delay, use the line as follows:

840 SOUND 32767,1:RETURN

This will give a minimum delay of 1 / 18.2 = 0.055 seconds, but will only take effect on the second and subsequent calls to the delay routine. This rate looks good in example SEQOSC2.

Both these delay methods will give a much longer minimum delay than the FOR loop method presented last issue, but will allow a given program to run on different machines with identical results (no tweaks needed). I hope this trick is found useful.

Another item: I found a typo in that article: the third software example, line 220, should read

220 SEQ(2) = 3

It is wrong on the example disk <sent to NN> also. Sorry 'bout that.

From the land of flashing ones and zeroes...

— Telford Dorr

Notes from the North: Cherveny returns fire

By Mark Cherveny

In response to Jerry Bolton's comments on the PNL temperature gauge, **replacements for PNL thermocouple lead** can be obtained from Simpson Electric Co. Catalog #21222 I/C cost: about $20 U.S. These are 10 ohm leads, you will have to remove the compensator resistance board from the meter and connect the leads directly to the meter. The end where the two wires are joined should be twisted together two turns to support the junction and prevent its breaking.

I was disappointed by your comments on **PK housings and UL inspection.** I believe that inspections are the only way quality can be preserved as the neon industry has not policed itself. I understand that on an island things are different but on the mainland there is no excuse not to at least offer UL (or equivalent) inspected sign quotes.

As part of the process of selling you should point out the hazards of non-inspected installations. I am very surprised that sign companies haven't been sued to bankruptcy over neon sign fires by insurance companies. It is fortunate that they are ignorant of the hazards and poor workmanship in the sign business. A good installation is a very rare thing these days in the USA; the only good work I have seen come out of the USA is from UNIONIZED shops (Paul Davis agrees that unions improve the quality of signs in ST #11/94:52).

The future of neon depends on quality uniform installations if the installation practices don't improve neon will be legislated out of existence on safety rather than "environmental" (AKA community do-gooders') concerns.

You mentioned the "pop-in flex connector": do you know if it is listed as a **grounding fitting?** Not all conduit fittings are listed for grounding so you may have to run a separate ground wire, which is not a bad idea considering how poor the connection of the flex to fitting is. Improperly grounded channel letters can give very nasty shocks, start fires and also cause radio interference. The industry definitely needs more exchange on installation techniques.

By the way, it is illegal for an electrician to hook up a sign without either **UL or CSA** (or equivalent testing laboratory) or authority having inspection jurisdiction. This fact should also be mentioned to clients; include mention of the cost of sign inspection and permit costs in dealings with buyers. Customers can also inquire whether competitors' signs have been inspected.

NEC (National Electrical Code) 600-4: "Every electric sign of ANY TYPE, fixed or portable, shall be listed."

Recommended reading on installation: Your country's electrical code; Chapters 4 & 11 in Neon Techniques & Handling; and ST columns by Davis in 11/88, 12/89, 1/91, 7/92, 11-12/92, 3/93, 5/93, 1/94, 5/94; columns by Perszyk in 6-8/89, 2/90, 4/92, 7/93, 9/94, 11/94.

The **Neorama transformer** was used behind plastic (usually corrugated) faces. The tubes were hairpin-shaped, three inches center-to-center and were set up in patterns of red, green and blue or a rainbow starting with red on one end and ending with blue on the other. The flashing patterns were either to make the face light up alternately red, green and blue (1-on-2-off-type flasher) or with the rainbow have one out of four off (standard bulb flashing sequence). Because they were behind plastic is why 45ma was used (and lack of room for 60ma). The faces for these signs were usually 4x8', with 16 tubes and four Neorama transformers in them. These signs were usually made double-faced and were sold mostly to drugstores and flower shops (I believe there is still one on a flower shop on Hawthorn SE in Portland OR). I have never seen this transformer listed in any of the old suppliers' catalogs. I would appreciate getting a copy of any listings or technical literature anyone has on it.

One can **economize on PK housings** on interior exposed neon by using PK housings for the transformer connections and one of the other methods listed below for connections between units:

- G cups with CPA assembly;
- glass sleeve covering tied-in connections installed with at least 3/16" spacing from background surface'
- G cups and GTO covered in glass bendback connection (between units);
- old-style cut-off bottle or Double G cup connections, installed so they are at least 20 degrees above horizontal (to keep them from falling off).

I agree with your **three-year warranty;** the only things I could add are:

- for cold weather, 60ma transformers must be used on mercury tubes. In order that the tubes will last they must be equipped with ceramic collar 15mm electrodes; no 12mm electrode that I have tried can carry 60 ma for long.
- Signs built on raceways or sheetmetal boxes and using standard housings have fewer problems with GTO burning out and housings breaking than when PK (through-wall) housings and flex are used.

I also have noticed the "centralization" of neon, as I both receive the large national franchises and do the smaller regional orders to ship out. As for a **neon decline** I don't see it (except for the decline because of the higher cost of neon compared to fluorescent plastic signs); neon orders have remained stable. I believe this is due to the higher standards of installation in Canada vs. the USA. This is not to say that there is not anybody doing good work in the USA, but so many companies get away with poor workmanship.

(More Net, from page 6)

to a third of it WILL be broken. I work with a lot of odd colors and sizes no one stocks at distributors. I also insist on the glass being from one batch and I usually have to have it yesterday. I have good luck most of the time with FMS glass (Brillite) which also happens to be my choice for powder stability and coat adherence. They put foam on the ends of the cartons and that is usually the problem area when they are dropped on end. Usually from shoulder height...

They tell me that the best way to ship delicate loads is Greyhound. That is because they are not automated enough to have belts and they don't usually pick up the boxes more than a foot (just from the underbelly of the bus to the cart)...

- Tom Biebel

I went thru a phase were I was absolutely panicked about mercury. At a shop I worked at, I carried a charcoal trap that I put in line with my blowhose. I refused to even seal a new bottle on the manifold without that trap. The bombing table there was like a toxic waste dump. If you looked really close, there were minute droplets of Hg in EVERY crack and crevice. The other benders called me "Mr. Paranoid."

I've relaxed a bit, as now I have my own shop and I treat mercury very respectfully. I did an extensive amount of personal research into Hg contamination, and I have concluded the following:

1. Spills should be cleaned up immediately, before they

(see Still More Net, page 17)

Careful plan, custom chair coddle bad back

*<**Editors' note:** Candice has had more than her share of back trouble. So we are happy to hear that she used some expert help to rework her benches to relieve back strain while she makes neon. And we're grateful for the following advice for a back-friendly neon setup.*

<Another Voc-Rehab note about neon is that it is considered a promising field for retraining disabled workers to perform, since lifting is light and it can be done from a wheelchair, something we're eager to address if anyone wants to share their experience. Lee Champaigne's National Neon Institute (707-747-6167) specializes in such training, and his informative brochure itemizes the physical demands of neon fabrication -- in case you ever get tired of explaining why you're exhausted after work...>

By Candice King

Do you have a bad back or leg problems? Worried about being able to continue in neon? Maybe altering your workspace can solve the problem.

After a second back surgery my doctor said that standing for long periods and repetitive bending were a no-no. I didn't want to give up 18 years of glassworking and retrain for a new career. After a few phone calls I got in touch with the vocational rehabilitation engineer in this area. Since neon is an unusual profession, we worked together to develop a plan to alter the workshop. Changes were made to the workbench, torch stands, flooring, and a rolling chair was added so work could be done from a seated position.

The workbench was lowered to standard table height above the flooring. The framework was recessed 14" to allow for knee space. Adjustments should be made to fit the individual, and the height should be as low as possible while still allowing for knee space. This will make it easier to visually get over the work to make sure you're on the pattern. Ninety-degree electrodes can be deceiving unless you are directly over them.

To measure the recess for the knees, sit at a table with your stomach against the edge. Get someone to measure from the edge of the table to the end of your knees and add two inches. A 2X4 frame was added around the table legs just above the flooring level, adding strength to the table as well as a footrest and something to push off from with my feet.

Now that my table has been altered, I may have to do some retrofitting. Over time the unsupported 14-inch overhang may bow. Here are some possible solutions: screw 3-4 flat iron strips to the underside of the table, placed front to back and evenly spaced. A 1x1 square aluminum tubing frame that has cross-bracing could also be screwed to the tabletop. If you have a better idea, let me know.

Measurements for altering the torch stands are easy. Take note of your hand and arm positions while standing at your torches (crossfire and ribbon). Measure from the floor to where your hands are, then sit down and resume the same position. Measure again: whatever the difference is is how much you need to lower the torch. Hopefully your stands are adjustable; if not, a trip to a welder may be in your future.

The crossfire stand required additional modification. My stand-bases are large because I like to move them around and don't bolt them to the floor. My chair's star base hit the edge of the torch base and would not allow me to get close enough to work in comfort. My arms were extended too far forward, causing back strain and reducing my range of motion.

To solve this problem an extension plate was fabricated to offset the torch head forward 12 inches. Use the existing bolt pattern on the stand flange, then mark the bolt pattern for the slidebar or torch bracket 12 inches away. Drill the bolt holes and assemble. Note: make sure the whole assembly is still stable; if it isn't, bolt it to the floor. A tippy torch is dangerous, particularly when lit.

The flooring is simple too. I have traditionally worked on a platform, so all the piping is underneath the deck. This is a good idea when using a chair, as you won't run into your lines then. A 14-inch extension to the platform was added under the table to compensate for the distance the table legs were recessed.

Since a little extra room is needed between the torches and the bench, when using a chair the remainder of the sheet of plywood was used to add depth to the platform. This allowed the stands to be moved further from the bench. As a finishing touch, a 2x2 strip of lumber was added around the edge to act as a bumper, keeping me from accidentally rolling off the edge. You may want to paint the bumper safety yellow to keep others from tripping on the unexpected edge (and possibly falling into a lit torch).

Choosing a chair can get a bit involved depending on your physical needs, but there are some basics to keep in mind. The lighter the weight and the easier it rolls, the less effort it takes on your part. Make sure there are no arms or that the arms are easily removed so they won't get in your way or tangle up with your blowhose. Look for a chair with a low, narrow back so your shoulder motion isn't restricted. Adjustable height, seat tilt and back allow you to change position during the day. A waterfall-type seat edge reduces pressure on the thighs and allows better circulation.

I highly recommend special castors that don't allow the chair to roll unless there is weight on the seat. I've had several close calls by half-standing in order to reach something and the chair wasn't there when I went to sit again. I haven't landed on my rear end yet, but don't take any chances, since saving your back is what this setup is all about. A cloth seat will be more comfortable in a hot environment and also adds some friction so you don't slide around in the seat. Being short I tend to sit on the edge of my chair so I can get enough of a bite with my legs to move around. The result is no back support and tiring quickly.

The solution is a customized chair. Some chair manufacturers are willing to alter chairs for specific needs, but it's expensive. I will soon get a chair with a shallow seat pan and a built-up back to accommodate my needs. With a recommendation from your doctor, insurance may pay the bill. Regardless of the cost, a good chair is a necessary tool. Go to a few office furniture showrooms and try all the chairs, see what fits you best. The company that provided my chair brought one to the shop for me to try for a few hours. Don't be afraid to ask questions and shop around.

When the alterations are made, you may feel a bit awkward for a few days. It doesn't take long to re-orient yourself and compensate for new body positions. My biggest obstacle was whacking my knees with the glass, or occasionally the floor when I had a long unit. This is happening less often now, and I'm happily toasting tubes about three hours a day. I wish I'd known years ago how much easier it is on the body to work this way.

This advice is targeted toward the bending station, but its general principles are easily transferrable to the rest of the shop. If you have any ideas, call me at 910-724-1434 in the afternoons and evenings (eastern time). I'm deeply grateful to Bill Pendleton at Voc-Rehab for helping me to continue in my life's obsession.

*<**Reader's note:** Mark Cherveny refers to "Save Your Neck" in Sign Business 4/94 as "a good article on relieving back pain (with) proper posture at the fires.">* ♦

Ed builds a better mess trap for manifold

By Edward DeZuzio

Here are some drawings and instructions for making a debris trap. I have mine attached to the manifold with large vacuum tubing to facilitate easy removal for cleaning.

Materials list for one manifold trap:

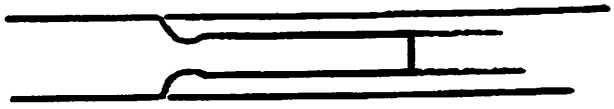
2x 12"-15" x 20mm clear glass
1x 12"-15" x10mm clear glass
1x 12"-15" x15mm clear glass
2-3 corks each size for tubes

In this first diagram you see one piece of 20mm gathered and drawn. You can heat the tube at the halfway mark. In gathering you want to double or quadruple the wall thickness – to get the gather so thick you heat no more that a 20mm length. (Double-wall will waste less glass – the more you gather the longer the pull will be). Keeping the glass still, with no horizontal movement (except for rotating), you will soon have the 20mm of hot glass. When you are ready to draw continue rotating the glass and wait a few seconds for the intense heat to leave the glass. Drawing the tube too soon will result in a thin glass wall. The end result you want is for the wall thickness to be at least that of the 10mm tube. Also keep an eye out for the drawn glass to close itself – you want to avoid that.

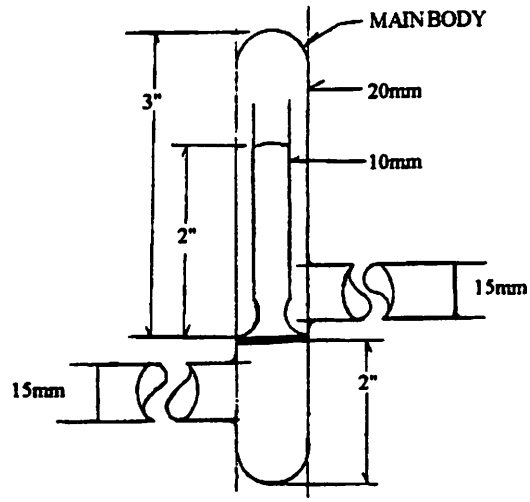
Do the same with two pieces of 15mm glass, drawing to 5mm-8mm. Set aside.

Once you have this "stemmed" piece of 20mm glass, locate where the drawn section is 10mm, plus or minus 2mm. Cut the drawn tube there and splice a piece of 10mm. If the drawn glass is thicker on the 20mm side concentrate the flame at that point – the idea here is to form a shoulder. If the drawn glass lacks the thickness then simply gather the 10mm tube at the splice and blow it out to form the shoulder. You'll need the 10mm tube to be a little thicker at the splice for the next step.

Here you see that a little neck is drawn into the 10mm tube – this is not a necessary step but will help in the following procedure. Be sure not to create a neck too little – down to 8mm at the smallest. Cut the 10mm to length 2" before proceeding.



In this drawing you see that the second piece of 20mm is joined to the glasswork which you just completed. You need a clean cut on the second piece of 20mm to make a good splice. The importance of the shoulder and 20mm mating properly should be considered the most important step. Because this splice forms a solid separating seal it must be of equal thickness around its entire circumference.



Press the two pieces being spliced together before entering the crossfire. Heat the touching glass, pushing them together to form a thick seal – before blowing – allow to cool slightly – keeping the wall thick.

The last two steps are identical but should be done in proper order.

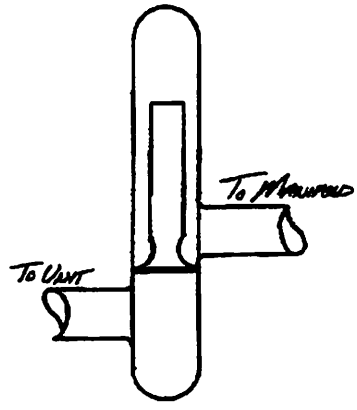
On the opposite side of the internal 10mm stem you will tubulate the 20mm so you can splice the 15mm unit arm to the body of the trap. The tubulation hole should match the diameter of the 15mm you pulled earlier. Proceed to splice the 15mm arm to the main body using the thicker drawn glass to expand to 15mm. Once you've finished this splice, anneal the opposite side and quickly do the same to the upper part of the main body. It is important not to pause at all during these last two splices. Don't forget to pull the 20mm closed after splicing 15mm arms! Anneal the entire piece with a "fluffy" flame and allow to cool in a flower pot full of vermiculite. (This will allow the piece to cool slowly – about 45 minutes to room temperature.)

Two last notes:

On unit and manifold arms, it is much easier to splice the smaller diameter drawn 15mm and use the thick wall to be the medium of the splice – if you blew a 15mm hole and tried to splice you're in rougher water. Mastering the gathering-and-drawing is a much more helpful skill.

Purchase vermiculite from a garden supply store. It can be preheated to allow even slower cooling (90 to 120 minutes). I've made thirty pieces and checked them for stress with polarizing sheets – they are all okay.

<Editors' note: If you're too lazy or busy to make your own, Ed also sells these – see his ad on the back cover.> ♦



A passionate plea for nickel-plated 'trodes

<Editors' note: Once upon a time – when, we're not sure, as there's no publication date listed – The Eyelet Specialty Co., Waterbury CT published a manifesto to promote its solid nickel electrodes, and here are excerpts of technical interest, passed our way by omnivorous neon historian Mark Cherveny:>

WHAT GOES ON AT THE ELECTRODES?

An electrode leads a double life, for it is alternately cathode and anode and must perform well in both roles. The voltage drop at the anode is low for most metals and the anode occasions little concern, but the cathode leads a hard life, for it is bombarded by ions or positively charged atoms of rare gas or mercury travelling at high speed, and its behavior determines the life of the tube.

The speed of these ions increases with the voltage drop occurring near the cathode (the so-called "cathode fall") and if the ions hit hard enough they may knock off a small amount of metal from the electrode itself, which may remain within the electrode or escape to the nearby wall. This action, called "sputtering," goes on at a measurable rate only under conditions far removed from sign tube operation. Cathode drops of 1,000 volts or more and very low gas pressures (usually about .1 mm) are required and at these high cathode falls cadmium, silver, gold and copper sputter rapidly, nickel and iron much more slowly, and zinc, aluminum and magnesium least.

It seems probable that the presence of traces of oxygen producing a thin, highly protective film are responsible for the low sputtering rates of the latter elements and that if oxygen were completely absent they should sputter much faster. The rates of sputtering decrease rapidly with a decrease in cathode fall and there has been some question as to whether any sputtering occurred under normal sign tube operating conditions where the cathode fall is only 70-150 volts.

WHAT HAPPENS TO THE RARE GAS?

The direct effect of any sputtering which might occur in a sign tube is relatively unimportant, but it has been assumed that sputtered metal absorbed rare gas and caused the tube to become hard and finally to cease operating, which would be important if true. This assumption has been found to be incorrect by H. Alterthum and his co-workers at the Osram Lamp Works in Berlin who performed a series of extremely careful experiments principally with hollow iron electrodes and made the remarkable discovery that neon was actually driven into the metal electrode where it was locked up but could be recovered by dissolving the whole electrode. Of even greater importance was the conclusion that "sputtering" had nothing to do with this clean-up of neon – a conclusion of great importance to the sign industry...

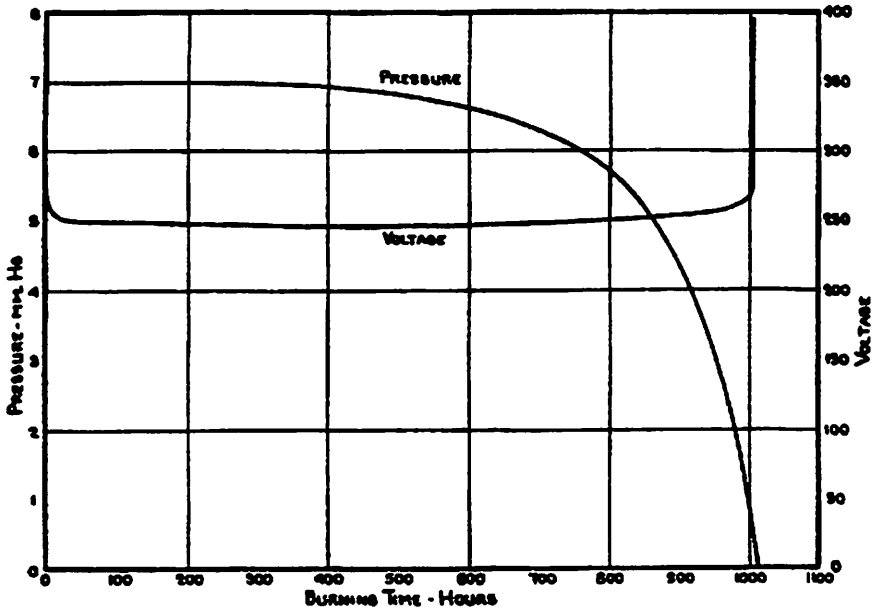
In most of Alterthum's experiments the tubes were operated on alternating current, but in one group of experiments the tubes were operated on direct current and the neon was found to be driven into the iron cathode.

Generally, Pirani pressure gauges were fused directly to the discharge tubes and no stopcocks were present so that errors from leaks were absent; furthermore, extreme precautions were taken to really de-gas the iron electrodes by heating in vacuo at least ten times by high-frequency induction followed by bombarding up to ten times in a helium-neon mixture at low pressure. In view of these and other precautions their data must be accepted as reliable. The change in pressure with time in a small tube filled with neon and equipped with iron electrodes as determined in the above experiments is shown in figure 1 and the rate at which atoms are driven into the iron electrodes and "cleaned up" at various pressures is shown in figure 2.

In this plot, data from three sets of experiments are shown and the agreement is good evidence of the high quality of their work.

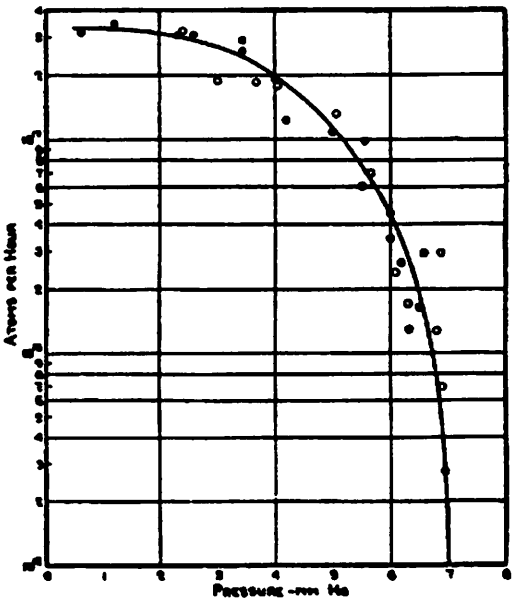
In view of the fact that the rate of "clean up" at pressures below about 2mm of mercury does not vary appreciably with the pressure as shown in Figure 2, further experiments were made in this pressure range to determine the relative time for electrodes of different materials to clean-up or lock-up a constant amount of neon.

(see Trode, next page)



Drop in Pressure with Time of Neon Tube with Iron Electrodes at 100ma.

FIG. 1



Effect of Pressure on Rate of "Clean-up" of Neon Tube with Iron Electrodes Operated at 100ma.

FIG. 2

Glass-cleaning acid poses potent threats

By Dirk Boonstra

As most European neon shops use hydrofluoric acid to clean glass, environmental problems can arise. This article will take a close look at safety issues concerning this acid.

The chemical symbol for fluoric acid is HG. This chemical combination's fierce reactivity is due to the exceptional strength of the bonding of the fluor atom with certain other atoms. In fluid or vapor form HF can affect many chemical bonds including those present in glass. It is also extremely damaging to living tissues, so caution should be taken whenever it is used.

In most neon shops a mixture of one part technically pure acid to ten parts water is used. The plastic bottles should be stored in a cabinet vented to outdoor air, and etching should be done similarly, making sure the contaminated air is blown outdoors to a site or height where it can't cause harm. Spilled HF should be wiped away with a rag sprinkled with chalk. Spillage in a flushing bath should be washed away with water.

Acid fumes and burns are both serious threats to health, so if you are using acid to clean glass, you should know what to do if an accident occurs. Please read and post this checklist in case of eye, skin or lung exposure to cleaning acids:

Eyes: immediately flush with clean running water for 10 minutes; use no chemicals. Bring patient to doctor immediately.

Lungs: get patient to fresh air and medical care quickly; use no chemicals (no aspirin or sedative, since lungs are filling with fluid).

Skin: flush with running water three minutes; cover wound with magnesium-oxide-water paste containing 20% glycerine. Get medical care immediately.

<**Editors' note:** *We omitted Dirk's instructions to physicians, as most U.S. emergency rooms have their own protocols for acid burns – and because an American doctor would rather die than have a patient tell her what drug and how much to use. Households with children should note that the half-liter plastic bottles look to kids like harmless shampoo bottles, and should store them well out of reach.*>

(Trode, from previous page)

It was found that the life value of nickel was 112% that of iron, a fact which is obviously important to makers and users of sign tubes. These findings are confirmed by practical experience with small Xenon and Krypton tubes which are filled to a pressure of about 2mm to secure useful brilliance and consequently are very hard on the electrodes. Of the many types of electrodes tried, uncoated nickel has proved to have the longest life.

Coated electrodes

In many instances special coatings are applied to electrodes to increase the electron emission which results in lower electrode temperatures on bombardment and in a lower electrode drop in use. However, in tubes containing mercury, some coatings may increase the rate of darkening of the tube walls although special coatings have been devised which appear suitable for such tubes.

Amalgamation

In connection with mercury much has been said concerning amalgamation without distinguishing between wetting of the surface of the metal with mercury, as solder would wet any well-fluxed surface, and the possible soaking in of mercury – which is a horse of a different color.

Copper is readily wetted with mercury which appears to soak in, but nickel and iron are much more difficult to wet with mercury, although it can be done. Nickel and iron electrodes after long use in mercury-containing sign tubes were removed, wiped off and examined by a well-known chemist who reported no mercury in either electrode. It is evident from this result as well as from practical experience with solid nickel and nickel-plated iron shells that mercury does not soak into nickel.

Iron, if clean, can be amalgamated as shown by the well known experiment of breaking a piece of iron under mercury in which the freshly broken surface becomes amalgamates. Iron, nickel, tungsten and platinum can also be amalgamated by rubbing them with mercury containing a little sodium which serves as a flux, but as noted above neither nickel nor iron appear to absorb mercury. This is further demonstrated by commercial tubes equipped with nickel electrodes plus a rare gas and a small among of mercury which show no change in the amount of mercury on long use – indeed tubes of this type have been run as long as 40,000 hours without loss of mercury. The universal use of nickel in hot cathode mercury rectifiers is further evidence of the excellent behavior of nickel in mercury tubes. ♦

(Prices west, from page 1)

So far, so good, but here's the morning after: the '90s.

Pop! There it goes! Neon art? Gone. Cheap neon arrives. Before you know it, no one's buying $10 per foot, or $180 palm trees that you can't call your mother on. Galleries featuring neon either folded, along with other high-end home furnishings stores, or concentrated on skeleton signs, cheaper than before but not better as standards fell and price was everything.

<An aside from the teacher in me: Get the electrodes RED when bombarding! Like embers in a fire. Do not gently char your beloved sliced-up phonebook, BURN it after it's placed in the MIDDLE of the tube, until it goes up in a puff of smoke. Pump it down until there's NO light in the tube when you flash the bombarder. If it doesn't age after a minute or two, open the tubulation and repump it; it's going to turn black in a few weeks. Also, I KNOW some materials suck these days, but it's important to do the best with what we have. It's a matter of pride...>

Wooing versus rueing

As a college student I befriended a playwright from Brooklyn, Joe Krausman, who wrote:

I went, I went a-wooing
to woo the Muse of Song,
I went, I went a-wooing
is that so really wrong?
The joy is in the wooing,
the prize is just insane.
I went, I went a-wooing
and I'd do it all again!

So, despite all the ups, down, and further downs in the world of neon, are you still having fun? And if you knew then what you know now, would you be where you are today?

And where are you today? If you're like most artists and small neon shops, you're battening down the hatches and waiting for the storm from the East to pass. It may seem that neon art may be at the bottom of everyone's wish list, but it isn't so. People still love it, they just can't afford it like they used to. So – we lower prices. Whittle down the cost of materials to $15, spend 15 minutes of time working at Warp 9.

Hey, it's a living! And it still beats doing windows, teaching, or driving a cab! ♦

Lead-free glass woos, wows testers on Net

Both TecnoLux and Eurocom are now offering lead-free glass, in both clear and coated versions. Here are some quotes from the Internet neon mailing list concerning samples that TecnoLux sent out:

Tom Biebel:

Dave sent me some to "Beta" test and give him my thoughts.

It requires a slightly higher heat than the lead glass before bending but not nearly as long as the soda-lime glasses. The glass is a bit stiffer but working time is very good due to the ample wall thickness. I think overall it is a tougher product. The primary flux still seems to be sodium so there is sodium flare from the glass in the torch which I like to visually check for even heating of the bend. You can eliminate this with didymium glasses which I wear with the soda lime anyway. Glasses are another subject which we also need to get into but that's another thread.

Cutting properties (particularly while cooling) are very good and the wall thickness is very good and consistent. One interesting property is that lead glass fluoresces or lights up with mercury vapor and UV where as pyrex and the new lead-free glass don't. I happen to like that look better. Since I have a mix of pyrex and lead in the shop I use a UV color checker to tell which glass is which quickly on my table. Now what, Dave??? Actually, it will be fairly easy to tell it apart by color. The lead-free has a slight blue-green tint on edge. I just got some samples from Dave yesterday and the glass is very nice in terms of quality. It doesn't scratch as easily as the lead so that is a plus also.

The other aspect is what I believe is the impetus to go to lead-free anyway which is safety. Just to make sure it wasn't a situation where we were replacing a known hazard with another I contacted a Council for the Arts safety source.

The lead-free glass that TecnoLux will be selling is a soda-barium-strontium glass so I asked about those compounds. I'll simply paste the reply I got from the industrial hygienist:

"Except for strontium chromate, there is no TLV for any strontium compound because it is just not very toxic. Sometimes we old folks get confused because we remember when some atomic reactions created a radioactive form of strontium which was getting into the food chain. But normally, strontium is not radioactive.

"Sodium compounds also is not very toxic unless the radical to which the sodium is attached is a nasty.

"Barium is toxic, but a long way from lead. Take a look at some TLVs:

Substance	TLV-TWA mg/m3
nuisance dusts	10 (compounds of strontium, sodium, etc.)
barium	5
quartz	0.1
cristobalite (fired quartz)	0.05
lead	0.05
cadmium	0.005"

While barium is toxic, it is such an improvement over lead that this new glass could be very good... Maybe my brother Chris will chime in with a second opinion since he tried it before me and works the glass more than me now anyway.

John Anderson:

I would surmise that the new glass is less apt to darken in a rich flame, since there's no lead to reduce. Did you notice this property?

Chris Biebel:

I tried as hard as I could to get it to darken and couldn't. I mean, I REALLY tried!

Howie Cohen:

I just received samples of lead-free glass in different sizes. I really am pleased the way it bends. It does seem that it is somewhat less forgiving if the glass is not completely heated all around the tube. I also tried a few experiments: I really cranked up the gas and could not get the thing to darken, as noted by several other benders on the net. I haven't pumped any tubes made with this glass but I can't imagine that it would pump any differently than lead glass. Well, I think the jury is out at least in my eyes and I would hope that the local supplier take the lead and stock up. I called the local supply company and asked if they have any of the new lead-free clear glass in stock. One of the head sales reps said to me, "I thought all the clear glass was lead-free." Do you think I should have clued him in? I did!

David Ablon:

...The lead-free glass will be available in 5' sticks. 50lb clear, 25lb coated standard, white, blue, green and 11lb "rare earth" super blue, magenta, traffic light green etc. Our distributors will be selling the lead-free and a few are actually interested (a new line of glass to inventory does not excite them). How easy it is to get will be dictated by the market. We will keep a large stock in New York and as the demand increases the distributors will stock more. In my opinion in 2 or 3 years we will be talking about the old lead glass we used to be able to get.

John Anderson:

...(I got) a sample of the lead-free stuff as well. I would describe it much as Tom did - it has a very slightly higher softening temperature. Finished (cool) units also feel stiffer, with less flex in a long unit. You can add gas to your heart's content - it will not blacken. I found that a slightly richer flame more than makes up the temp difference. It essentially works the same, and I made a flawless letter with the first piece I picked up. It seals perfectly to lead glass, with no strain evident under a polariscope. I placed several bends back into a sharp flame, and there was no fracture.

The only drawback I could imagine is that it has a tiny bit of sodium flare. Not as much as the colored glasses, so if you work these without didymium specs you'll not need them.

David Ablon:

I do not see a change in price in the Tecnolux lead-free over our lead glass. The glass is about 10% lighter so the price per lb. will change but the per-stick price should stay the same. For uncoated clear the price will go up for now because the glass is produced in Europe so there is some sea freight. We now have some stock so anyone who wants free samples to play with call us at (800) 333-6366.

Kenny Greenberg:

I will add my voice to the rave column.

TecnoLux is surprisingly understating the quality of this glass.

I just put some sticks through a variety of my best torture routines. First I made one of my notorious complex knots. These suckers get twisted and cranked and hot glass often contacts cold while squeezing the tube thru a tight spot (Example: http://www.neonshop.com/krypton/neonart.html)

To make it more interesting I decided to work near an open window where a rather cool breeze was steadily flowing & I hardly annealed. Though the process itself tends to be self-annealing since more & more glass ends up in the flames, I made up for this by setting the piece down & walking to my office to swap disks on a 16-disk

(see Lead-free, next page)

(Lead-free, from previous page)

installation to my PC.

I also generously dropped the work often to see how it bounced.

This glass is exceptionally forgiving. It's a slightly different feel from lead - I don't think that even a beginner would notice. The clear cuts very well, though my coated sample didn't seem to cut as well. I imagine that the baking process might need some tweaking.

Second test, I pulled out my oldest, dirtiest, plugged-up hand torch and proceeded to make one of the clearest splices I've ever made. This feature alone will blow lead glass off the map.

Third test was a nice 22' radius sweep to see if the glass walks. It simply doesn't.

So my conclusion is: Thank you Tecnolux for bringing this to the neon market & I agree, once we become old-timers, we will admonish the youngsters as to how we did clean splices like that, even when there was only lead glass.

John Anderson:

I found it very forgiving as well. I stuck all the letters I made from it into a single unit, and it was exceptionally strong. It also tubulates very well. Try it.

I think it's really exciting, as this is the first really _new_ thing to come to neon in several decades.

Tom Biebel:

I also failed to mention that the length is metric since it is European (as I realized when I bumped it on the floor). They measure 59 in. long. So Dave, who is going to pay for the modifications to my bending table which has standard-size glass storage bins (with only about 1/5 of them extra long for European stuff)? BTW, you sent me some samples that were only 4 ft. long. Why the difference and which size will be the one you are selling?

But you heard it first....on the net.

<Editors' note: As of December 1 TecnoLux has lead-free glass stocked and available; Eurocom will have it available "in the first quarter of 1996".>

(Prices east, from page 1)

on a window ledge. According to witnesses the lights dimmed and a strange smell filled the dining room. 'I saw lightning shoot from the mayor to Andrea, straight from her fingers! God, it looked like something from the movies. The poor girl just laid there in spasms.'" ...You know the rest.

What if the competition really is competition? Careful analyses of the job specs and production methods has to take place. For that price which is 60% less than yours, take a look at the brand of materials, diameters of glass, type of bending, warranty service, turn-around time, blah blah woof woof. Questioning the glassworker's wage is the last thing you want to do. Could it be that five years ago we were all just overpriced? How can that be? When I started in glasswork journeymen were in the low 30s for annual income. Whatever happened to that now dispersed figure? Hell, ask the $5/ft. Ruby Red people if they even know what a journeyman is!

The third conclusion: Maybe it is time to change the client base. An educated consumer will be your best customer. It is your job to educate them. Do it with any means possible. A wholesale client tells me one afternoon that I should take a ride and check out this job we lost, to see what my competition is providing. Do I want to see Ruby Red that has been sold for $5 per foot? It is obvious that the customer has no idea of what they are buying! I am busy with wholesale for the trade and high-quality users of luminous tubing. Most of my clients know my work. It isn't getting or going to get any easier. BUCKLE UP! IT'S THE LAW!

One customer comes in and asks for a price on three units per sign, a total of six signs. Although the entire order is 30 complete signs, his lack of planning has left him to have the fabrication done at many shops.

Previous prices to him have yielded no work as he is purchasing glass for $4/ft. My price for exposed glass is a minimum of $5/ft. for this type of work. What is the extra $1/ft. you may ask – well, it's no visible splices and a block-out-plane type of bending (all the units were dipped); it's 12mm instead of 9mm (12mm at his request; for the price it should have been 10mm).

Then what do I see at his shop – shit glass 8mm tubes, blocked out by hand, oval-O's and completely unreadable from any angle except straight on – an insult to his effort in negotiating a lower price!

On a closing note: I have a client in a position to offer neon all over the world. He also makes his purchases based on price. Because of the proposed quantity of his signs and the repetition of their design he has his own price list. Before I prepared the prices I went to check out what he was already buying. What he shows me are hundreds of units, all single units consisting of 4 to 13 letters at 3" in height and 24" in length. He informed me that he could purchase any one of these units in any color he needs for $50 each. The last words of my cover letter for his price list were these:

"Upon finishing your review of the price list keep in mind the quality of the work you have received in the past, both from Shadowmaker and other suppliers. Keep in mind also that the rest of the world will see the products you are offering. It is true that the majority of the population will not see the flaws of a neon sign ... just the pretty colors. However, there is security in offering a sound product in which our trade will respect." ♦

(Videos, from page 7)

For beginning benders, receiving these tapes with their equipment is a start, but I would recommend further exploration, preferably school instruction.

Demonstrations show how to lay out and bend an OPEN sign. The bending sequence of the alphabet is shown using a magic marker on computer paper letters and I found it hard to follow; there is typical background noise too. Vic does point out some safety tips such as wearing safety glasses, hair restraints around the fires, and how careless bombarding can be fatal with no second chances.

(Still More Net, from page 11)

disperse into ever smaller droplets. A small suction device is good, as is masking tape (yes, I got this out of Fusion magazine and it seems to work great).

2. The practice of sprinkling sulfur on Hg is only moderately effective. It does form a "skin" of HgS over the droplet, but does not completely amalgamate it. Finely powered zinc works better. I have some that is "60 mesh" size (whatever that is) and it reacts more vigorously and completely than sulphur. You can actually sweep these "rocks" up. Some commercial Hg clean-up products contain sulphur mixed with strong alkalines like lye. This is supposed to be effective, but it's perhaps only practical in a large-scale decontamination.

3. Once you fail to take step #1, the decontamination process becomes manyfold more difficult - perhaps impossible without discarding contaminated surfaces.

I also believe a great way to control spills is to have your bombing table of a smooth surface, like Formica, and do all your filling on that table. A shallow "ditch" routed around the perimeter

(see Even More Net, page 19)

(Last Bull, from page 20)

"In recent years, local authorities are extremely interested in the beautification of their cities. During the recent Spring Festival, it could be seen in various cities ... were brightly lit at night by neon signs and decorative lights. In some cities, there were even competitions organised to recognise the best light decorations. There is also a gradual merger between light decorations and lighted advertising signs."

If you're interested, subscribe to **Asia Pacific Sign Magazine** at Mailway Sdn. Bhd., Lock Bag No. 203, 46720 Petaling Jaya, Malaysia.

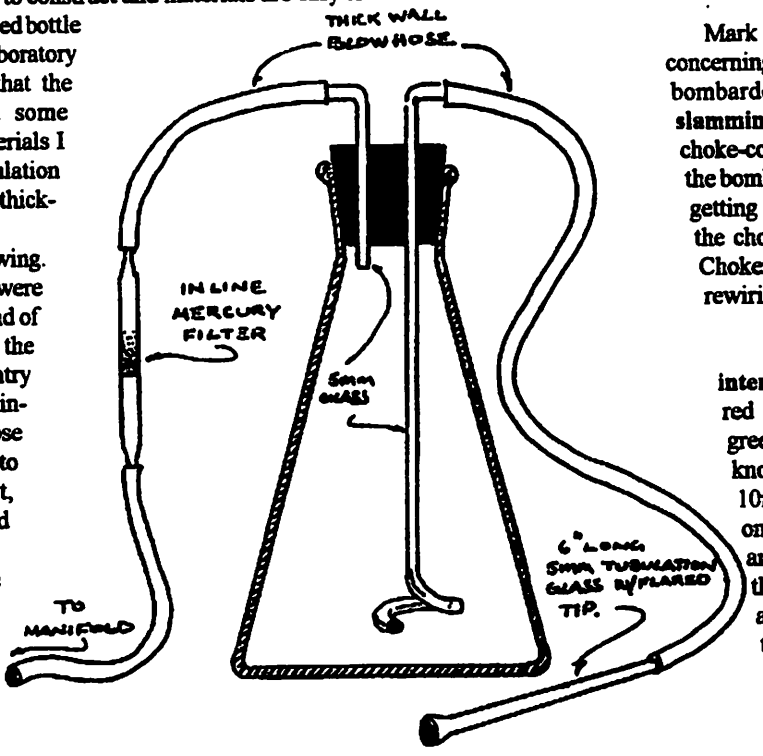
Kevin Russell called to find an old ribbon burner on short notice (no luck) for his on-site fabrication of a public sculpture piece in Tacoma. Kevin, who does neon work for Dale Chihuly, recently restored the neon on the oldest theatre in Washington state: The Blue Mouse Theatre in Tacoma, which features 25 ten-inch **neon mice on a five-stage chasing animator**.

New subscriber Denis Eckstein of Madison WI wrote that he "recently came across a tool that readers may find useful. From time to time I get some mercury spillover on my bombarding table, and find it tedious chasing it around with a piece of paper trying to get it to the edge and into a jar.

"I was talking about this with an elder colleague who suggested I make myself a **mercury vacuum cleaner** using the vacuum from my manifold. It's very simple to construct and materials are easy to find. I picked up a conical-shaped bottle and rubber stopper at a local laboratory supply company. I thought that the conical shape would lend some stability. The rest of the materials I had in my shop: 5mm tubulation glass and a couple of pieces of thick-wall blowhose.

"For assembly, see drawing. The only refinements I made were to bend a small spiral at the end of the incoming tube to allow the mercury to make a smoother entry into the bottle. I also added an in-line mercury filter on the hose connecting to my manifold to ensure that none will enter it, and a mini nozzle with a flared tip for easier handling.

"Now when some mercury gets away, all I need do is attach the hose of my "merc-vac" onto my manifold in place of my blowhose, open the stopcock, and tidy up."



Two glossy group show announcements reached us, with gorgeous neon and some crossover names in both: "**Fire Works!**" at Portland OR Contemporary Crafts Association, and "**Theatre of Light and Motion**" at the City of Brea CA Gallery. The latter show offered a "Children's Tube Bending Workshop and Tour" which for $5 or $10 per child promised "in this fun and creative workshop ... you'll learn to make 'neon' art – out of tubes!" *<Really? What kind of tubes?>* Naturally both shows are over now...

Kathee Laffranchi of Renaissance Neon in Lancaster CA "recently became the caretaker of a five-foot neon **Pink Panther** which some guy had got at a movie studio years ago and had in his garage. He brought it in to get its leg fixed and never came back for it. We don't know what to do with it either, but I like it. Our only other 'historical' neon is the remains of the local drive-in theater sign that we salvaged one weekend before they tore the rest of the place down. Every year Charlie and I each enter something in the local fair under 'sculpture, any material.' At first they didn't want our stuff in there (Fine Arts) but now they look forward to it. I was surprised but glad to win first prize this year for my neon starfish on a ceramic rock. Charlie also made neon Christmas lights for his house a few years ago and they got in the paper one year. I understand he threw some ham radio equipment on the roof recently, right where he had put the Christmas lights, but he had forgotten, and he heard a lot of glass breaking, so I guess he will have to come up with some new ones this year."

On a family visit to Florida we visited the **Martin Theatre** in Panama City, which has a splendidly restored art deco neon exterior. Since our town's Palace Theatre restoration has fallen victim to budget cuts, we were cheered to hear the story of this theatre-turned-arcade-turned-theatre, but sorry that the interior decor was unrestorable. The administrative director made the sage observation that southern states have been relatively under-represented in arts grant programs, and she said that movie theatre restoration proposals (like the Martin's) have been greeted eagerly by the NEA and NEH as well as regional, state and local groups.

Mark Cherveny passed on this tip concerning electronic chokes – if your bombarder is putting out a **needle-slamming spike** at each startup, wire the choke-controlling variac downstream of the bombarder contactor, so that it's not getting power until the same moment the choke and bombarder are. (Ted's Chokemaster ceased its spiking upon rewiring this way.)

A perfect match of **color intensity**: 15mm neo-blue pumped red and running at 30 mA; 15mm green running at 10mA. As far as I know Actown is the only supplier of 10mA transformers, and those are only available in 5,000-volt core-and-coil models. Fortunately, for the above job a 5,000 fit perfectly; a line of 10 to 20 mA outdoor-type units in a full range of voltages would be a useful option (manufacturers, are you listening?).

Ed Biggar is looking for a **6" ribbon burner**, if anyone has one available. Ed can be reached at 918-756-5380. Rumor has it that they will be soon "reissued"...

Harry Friedman writes: "Years ago I began to fiddle with various electronic means for exciting light from conventional neon tubing. The result of this work was a 3 X 20 foot 11-tube sculpture installed in a Deco moviehouse in late 1986. The sculpture used a

(see More Bull, next page)

(More Bull, from page 18)

central control circuit that scrolled light through the individual tubes in a preprogrammed pattern. At that time I could find no suitable HV transformer that could scroll 8mm clear neon lengths of 51' with acceptable linearity, brightness and efficiency. Consequently I had to develop my own specialized parts...

"Years have passed and I have done a few other pieces, but have not marketed much or promoted the system. I have continued to develop the process, which in the rather anti-neon atmosphere of Boston counts for something I guess.

"The current state: I have written a modest **neon sign design application for the Macintosh** computer. The program is similar to MacDraw. The sign designer draws a prototype sign onscreen. When a suitable shape is finished the designer may program each electrode's on/off/scroll out/scroll back pattern on a graphic screen tablet. The user then "runs" the prototype sign pattern onscreen to assess a given pattern's viability.

"After a pattern is tested the designer clicks a menu command and the timing data is sent from the computer to an Eprom memory chip. This chip is then plugged into the sign circuit where it will cause the sign to emulate the chosen pattern. In essence the system is a CAD tool for animated neon signage. Other features include the ability to paste backgrounds into the program, full I/O including file storage, printing, scanning, etc. Currently the system will program signs with up to 60 electrodes."

<The program is patented U.S. #4,818,968; Harry may be reached at (617) 739-1539.>

Ted query: What's anyone's guess on the percentage of use of high power factor transformers? And is it possible to overload the primary wiring with the "hidden" high current draw from normal power factor transformers?

To quote from the Miller book: "... a 500-watt installation on a 115-volt circuit draws 4.8 amperes from the line at 90 percent power factor. At 50 per cent power factor, typical of many uncorrected transformers, the line current for the same installation is 8.7 amperes, or nearly twice as great."

Thus, one could have three normal power factor transformers drawing a "safe" 14.4 amps nominally, but really drawing 26.1 amps and overloading 20-amp circuit. Right? ♦

Suggested supply sources

Advertised as "FOR GLASS BLOWERS ONLY!": **Bronze screen** is being sold by Dura-Glo Products (makers of electrode-savers). Doesn't warp like aluminum, has longer life at lower cost than non-bestos. "Spring steel banding at the borders ensures a flat 'snap-back' repositioning with every range of movement." You can order direct for $75; fax 'em at (609) 395-8819, or call (609) 395-7184.

Robert Bodek at P & B Neon in Malvern PA: "For those looking for a great glass-temperature meter, I recommend an **infrared temp gauge**. Dickson Co. of IL (800-323-2448) makes a great meter.

"Let me tell you that they are pricey. Their IR550 model uses an infrared beam to measure the surface temperature of the glass, not a contact thermocouple. I modified it by attaching it to a metal base. You just point it at the tube and read the LED display.

"For those looking for an inexpensive (about $50) bombarding MA meter, contact me at (610) 296-2364."

"Shockwatch" is a shipping-label type sticker that changes color upon impact – VERY useful in our field for a quick-check of shipped neon. Available from Media Recovery Inc., 1195 Empire Central, Dallas TX 75247, (800) 527-9497. ♦

(Even More Net, from page 17)

of the table will catch any droplets that roll.

This all applies to spills of course. The other sources of contamination would be re-using mercury traps, exhaust from your mechanical pump, and repairing mercury tubes. All of these are avoidable. The pump exhaust should exit to the outside.

I agree with Tom that most people use way too much Hg in tubes. I have seen tubes with a giant pea-sized glob rolling around. All that's needed is enough to vaporize to an equilibrium with the filling pressure of the tube. This is usually just a few "salt" grains. It takes a bit longer to age in the tube, but once it does it lights just as well even in cold weather.

I feel comfortable because I know I'm doing everything I can to protect my health, and I know many older neon folks that were much more careless during their careers. Most of them are okay. I know that's a lousy gauge of effectiveness, but it makes me feel better!

-John Anderson

I have some high-end clients specifying 5 years - which hopefully allows the more careful shops to have a crack at these. Of course you can't always be assured that the environment will cooperate. You'd be amazed how dusty it can get in the most seemingly pristine lobby.

My shortest warrantee is 2 yrs. I use it as a bargaining point sometimes. I don't think 3 should be a problem. Keep in mind that today we are being squeezed into faster and cheaper work. Where can you get anything these days with a 3 year warrantee?

Here in NYC, there are shops doing installed outdoor work at $9/ft (Uh oh, did I just open the one subject we haven't really touched on here?). The work fails 3 to 6 months down the road and the clients come to me (they can't locate the shop that did the work) expecting a miracle.

- Kenny Greenberg

The problem is, there are some here in town that just bolt a $15 core & coil to the back of 1/8" plex (or wood, or...) then wire-nut a power cord to the primary and presto (leaving the trans exposed, btw). Many times they skip the plex altogether and just hot-glue the neon on the window, then string 20' of GTO over to an exposed outdoor trans. I used window signs just as an example - this "type of work" is done with all sorts of neon projects. It's very hard to bid against someone doing this. Especially with retail work, where you're just "the shop with the higher price" in the Yellow Pages.

- John Anderson

I was taught to use natural gas for flushing old mercury repairs by Alex Miller (Samuel C.'s brother), he also wrote the chapter on glass bending in Neon Techniques And Handling. Remember this was 16 years ago and many ideas have changed since. Alex Miller had a trade shop in the Bronx. Back then many shops had a flask of hydrogen for flushing. This is much better because it is free of impurities and pure active ingredient. Another way I have used natural gas is in the processing of uncoated colored glass filled with neon. After first bombarding the unit and after it has cooled somewhat I close the main stopcock and fill with 2mm of natural gas. I then re-bombard with the gas and this enables me to get the glass very hot a second time with out reheating the electrodes red. I am very wary of doing this with merc. units because the smallest amount of natural gas causes a violent wiggle. Go ahead, try it! As for safety? I have never blown my self up this way although I heard a story of an Italian bender who blew up his manifold using this technique. Mix natural gas with air and all bets are off. ♦

- David Ablon

BULLETIN BOARD

Kent Fiske of Jackson WY: "An old neon worker told me he once had an **induction heating coil** for sliding over electrodes and heating them under vacuum but the government took it away from him during WWII. I'd like to use the approach of baking the tubes under a vacuum and then heating the electrodes inductively on sculptural pieces that don't lend themselves to uniform heating by conventional bombarding. Does anyone know what frequency and power I need to 'cook' an electrode?"

Stuart Rose of Vienna VA: "Special thanks for the article on cheap animator. I am curious also as to the **durability of flashing transformers** on their primary circuit. I have been told this wears them out prematurely although I was given no specifics, and few alternatives. Are primary flashers used frequently for neon transformers? Which transformers have a proven track record, and what is the longest life span you can hope for? I'll start off with Christmas lights as Mr. Dorr suggests. Also, are there any homegrown secondary flashers around? It couldn't be THAT difficult..."

James O'Neal of Alexandria VA wants info on "the best way to handle and **inject mercury.** My friendly neighborhood glass and materials supplier recently informed me that he can no longer obtain commercial mercury injectors. What gives? Is this more environmental noose-tightening or just lack of demand?

"I've read the tip on using a B&D syringe and the condemnation of the woodscrew-suction-through-the-manifold injection trick and would like to see more articles dealing with this rather crucial part of the operation."

We get NESA press releases on a regular basis, but a few new resources and services they are advertising might be helpful to some sign shops.

In particular, we were curious about the "**sign-code library**": "These materials help those who work with the planning community in developing new ordinances or challenging existing ones." This is done with computer searches using specific information, say on "awnings"; results are returned by fax or mail. NESA Vice Chairman Kirk Brimley reportedly reviews and annotates each code for strengths and weaknesses.

NESA also quoted its cocksure testimony to the EPA concerning disposal of mercury tubes: they confidently said "there is no evidence that neon lamps are a substantial threat to human health or the environment. ...Moreover, since sign lamps are but a small fraction of the fluorescent-lamp industry, EPA's attempt to regulate sign lamp wastes is the equivalent of straining at gnats while swallowing camels."

At a past NESA we met (Ms.) Darrel Lee, editor of **Asia Pacific Sign Magazine**, an Expoconsult offshoot like the glossy European Sign magazine. The magazine was started in 1993 in Singapore but has since moved across the causeway to Malaysia, and offers Chinese translations of most text. It shows a bit of the future of international signage, with advertiser profiles and some reportage, recently examining the booming sign & outdoor advertising industry in the Canton/Guangzhou area of China adjacent to Hong Kong.

Excerpts from a speech by Zheng Wudong, a Canton provincial advertising official, include the tantalizing remarks:

"Outdoor advertising in Guangdong has been put within the jurisdiction of city planning and advertising control. There is a standard system of outdoor advertising regulations for the entire province. Various cities are drawing up legislation concerning the control of outdoor advertising.

(see Bull, page 18)

ADS

Wanted – Neon Dynamics Flow scripters, new, used, returned or semi-operational. Please call Cork Marcheschi 415-621-3981 or fax 415-621-2096.

Shadowmaker Neon (201-694-2585, fax 201-694-2768) is selling **silicone rubber stoppers** for glassblowing – better than rubber or cork, with a 500°F temperature resistance for those finger-burning bends. They are also very tear-resistant, yielding fewer bits and pieces in blown tubes. A $9 sample pack contains (3) 8, 9, 10mm; (3) 11, 12, 13mm; (2) 15mm; (2) 18 and 20mm. Price includes first-class mail (continental only) shipping. Also, a minimum order of 15 corks mixed and matched can be purchased for:

8-9-10mm: $ .30 each
11-12-13mm: $ .65 each
15mm: $1.10 each
18 & 20mm: $1.40 each

Ed's also hawking **debris traps** (see article; $19.50 each plus shipping/postage) and **metal window frames** for neon signs, with a 3" return on window bumpers; vinyl protection caps for the window; optional tube supports welding directly to 12ga steel frame; unfinished or painted black or gray; 6' hanging chain included. Fax a pattern for a quote; shipped UPS.

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